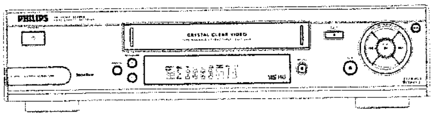
Video Cassette Recorder DECK: Turbo Drive APOLLO 21

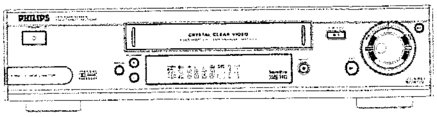
Service
Service
Service

V25978

VR710/02/07/16/39/58
VR765/02/07/16/39/58
VR810/02/07/16/39
VR910/02/07/16/39/58



VR710, VR765



VR810, VR910

Service Manual

Evolution: AA

For technical data reference is made to the Service Manual of APOLLO 20 **4822 726 15538.** The present Manual states only the differences. V23370

156

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

Survey of types:

VR710/VR765:	Longplay, FM Audio, Tape manager
VR810:	Longplay, FM Audio, Tape manager, Jog/Shuttle
VR910:	Longplay, FM Audio, Tape manager, Jog/Shuttle

Survey of versions:

/02	PAL B/G German Stereo
/07	PAL I, NICAM
/16	PAL B/G, NICAM & German Stereo
/39	PAL B/G & SECAM L, NICAM & German Stereo
/58	PAL B/G & SECAM BG/DK, NICAM & German Stereo

Survey of remote controls:

VR710/VR765:	english:	RT118/101	8622 661 18101
	french (/39):	RT118/104	8622 661 18104
VR810 :	english:	RT119/101	8622 661 19101
	french (/39):	RT119/104	8622 661 19104
VR910 :	english:	RT517/101	8622 665 17101
	french (/39):	RT517/104	8622 665 17104

Survey of tape decks:

VR710/VR765:	WDQT-S4/2	4 Video+ 2 FM-Audio Heads
VR810, VR910:	WDQT-S4/2S	4 Video+ 2 FM-Audio Heads Swing search

Published by FS0016 Video Service Department Printed in the Netherlands © Copyright reserved Subject to modification (GB) 3103 785 20400

Show view / Videoplus+ is registered by the Gemstar Development Group

PHILIPS

Table of contents

Chapter 1
TECHNICAL DATA AND FEATURES

Page

Front page ... 1-1
Table of contents ... 1-2
Survey of sets and features ... 1-3
Survey of sets and PCBs, Technical specifications ... 1-4
Safety instructions ... 1-5/6
Direction for use ... 1-7

Chapter 3
PRINTED BOARDS

Adjustment procedures ... 3-1
List of abbreviations ... 3-2
Wiring diagram ... 3-3
Block diagram Video ... 3-4/5
Block diagram Audio ... 3-6/7
Block diagram Digital ... 3-8/9
Block diagram power part ... 3-10/11

Power supply ASM

PCB drawing ASM ... 3-12
Circuit diagram ASM ... 3-13

Mother Board

PCB drawing Mother Board ... 3-14/17
Circuit diagram (PS) ... 3-18
Circuit diagram Front End (FV) ... 3-20
Circuit diagram Stereo Decoder (FM_STEREO_TDA) ... 3-22
Circuit diagram Stereo Decoder (FM_STEREO_MSP) ... 3-23
Audio FM (AF) circuit diagram ... 3-24
Circuit diagram Erase Oscillator (ER) ... 3-25
Audio linear-AL circuit diagram ... 3-26
Video Signal Processing (VS) circuit diagram ... 3-29
Head Amplifier (HA) circuit diagram ... 3-30
SECAM Processing (VS_SEC) circuit diagram ... 3-33
Chroma Noise Reduction (CNR) circuit diagram ... 3-34
In/Out (IO)circuit diagram ... 3-35
Central Control (AIO1) circuit diagram ... 3-36
Deck Electronics (DE) circuit diagram ... 3-39
Central Control (AIO2) circuit diagram ... 3-40
On Screen Display (VPO) circuit diagram ... 3-41
Circuit diagram FOME, VPS, PE ... 3-42

Display Control ADCP18

PCB drawing ADCP18 ... 3-44
Circuit diagram ADCP18 (DC) ... 3-45

Connector PCB ACP18

PCB drawing ACP18 ... 3-46
Circuit diagram ACP18 ... 3-47

Chapter 4
TAPE DECK

Page

Deck parts replacement

Auxiliary tools for deck adjustment ... 4-1
Deck layout diagrams ... 4-2
Lift ... 4-2
Head disc ... 4-3
A/C Head ... 4-4
Threading motor ... 4-4
Capstan motor ... 4-4
Pressure roller ... 4-4
Roller unit right ... 4-4
Roller unit left ... 4-5

Adjustments

Tape path ... 4-5
„Roller unit left; roller unit right“ ... 4-5
A/C Head ... 4-5
Horizontal distance ... 4-6
Brake band ... 4-6
Tape tension adjustment ... 4-6
Friction clutch control ... 4-6
Reverse brake control ... 4-6
Top view, Underside view ... 4-7

Exploded view

Cleaning and lubrication ... 4-8/9
Parts list ... 4-10

Chapter 5
PARTS LIST

Exploded view of cabinet parts ... 5-2
Cabinet parts ... 5-3
Power supply ... 5-4
Mother Board ... 5-5/11
Display Control ADCP18 ... 5-12
Connector PCB ACP18 ... 5-13

Features

Specification Items	VR710; VR765 /02	VR710; VR765 /07	VR710; VR765 /16	VR710; VR765 /39	VR710; VR765 /58	VR810/02	VR810/07	VR810/16	VR810/39	VR910/02	VR910/07	VR910/16	VR910/39	VR910/58
Backup Clock	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs
Tuning - presets	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Reception														
PAL B/G	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
PAL I		✓		✓			✓		✓		✓		✓	
PAL D/K					✓									✓
SECAM L/L'				✓					✓				✓	
SECAM BG				✓	✓				✓				✓	✓
SECAM DK					✓									✓
German Stereo	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
NICAM		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Rec/Pb PAL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rec/Pb SECAM				✓					✓				✓	
Rec/Pb MESECAM				✓	✓				✓				✓	✓
NTSC Playback	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Modulator	Pal G	Pal I	Pal G	-	Pal G/K	Pal G	Pal I	Pal G	-	Pal G	Pal I	Pal G	-	Pal G/K
Auto Tuning	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
Auto Install		✓					✓				✓			
Plug & Play	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sat mouse	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Guide Channel Mapping	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time/Date Download	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Synchro edit										✓	✓	✓	✓	✓
Auto Tape Length Recognition	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wind/Rew. Time (E180)	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s
VISS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Studio Picture Control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Noise canceller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Smart Picture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VPS/PDC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ShowView	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
VideoPLUS +		✓					✓				✓			
Rec.Prep. Mode Scart 1/2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Audio Dubbing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cinema Link (pin 10)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dolby virtual surround						✓	✓	✓	✓	✓	✓	✓	✓	✓
Smart sound						✓	✓	✓	✓	✓	✓	✓	✓	✓
Tape Manager	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

PCBs & Tape Decks

	POWER SUPPLY	MOTHER BOARD	DISPLAY CONTROL				TAPE DECK	
	ASM1	AMB	ADCP18	ADCP18.1	ACP18	ACP18.1	WDQT-S4/2	WDQT-S4/2S
VR710; VR765 /02	●	●	●		●		●	
VR710; VR765 /07	●	●	●		●		●	
VR710; VR765 /16	●	●	●		●		●	
VR710; VR765 /39	●	●	●		●		●	
VR710; VR765 /58	●	●	●		●		●	
VR810/02	●	●		●	●			●
VR810/07	●	●		●	●			●
VR810/16	●	●		●	●			●
VR810/39	●	●		●	●			●
VR910/02	●	●		●		●		●
VR910/07	●	●		●		●		●
VR910/16	●	●		●		●		●
VR910/39	●	●		●		●		●
VR910/58	●	●		●		●		●

GB

Technical Data

D

Technische Daten

F

Caractéristiques

Mains voltage	Netzspannung	Tension secteur	220 – 240 V
Mains frequency	Netzfrequenz	Fréquence	47 – 63 Hz
Power consumption:	Leistungsaufnahme:	Puissance absorbée:	16 W during operation
with Low Power Standby	Standby mit geringem Verbrauch	avec la fonction veille faible consommation	< 4 W
Ambient temperature	Raumtemperatur	Température ambiante	+10°C to +35°C
Relative humidity	Relative Luftfeuchtigkeit	Humidité relative	20 – 80 %
Weight	Gewicht	Poids	4.3 kg
Fast forward/rewind time	Vor-/Rückspulzeit	Temps (re-)bobinage	typ. 95s (E180 cass.)
Position of use	Betriebslage	Position d'emploi	horizontally, max. 15°
Video resolution	Video-Auflösung	Résolution vidéo	≥ 240 lines VHS
Audio	Audio	Audio SP:	80Hz – 10kHz (±8dB)
		Audio LP:	80Hz – 5kHz (±8dB)
		FM Audio:	20Hz – 20kHz (±3dB)

NL

Technische Gegevens

E

Datos Tecnicos

I

Dati Tecnici

Netspanning	Tensión de red	Tensione di alimentazione	220 – 240 V
Netfrequentie	Frecuencia de red	Frequenza di rete	47 – 63 Hz
Opgenomen vermogen:	Consumo de potencia:	Potenza assorbita:	16 W during operation
met Low Power Standby	con standby de bajo consumo	in attesa a basso consumo	< 4 W
Omgevingstemperatuur	Temperatura ambiente	Temperatura ambiente	+10°C to +35°C
Relatieve vochtigheid	Humedad relativa	Umiditá relativa	20 – 80 %
Gewicht	Peso	Peso	4.3 kg
Vooruit/terugspoeltijd	tiempo de (re-)bobinado	Tempo di (ri-)avvolgimento	typ. 95s (E180 cass.)
Gebruikspositie	Posición de uso	Posizione di funzionamento	horizontally, max. 15°
Opplossend vermogen	Resolución video	Risoluzione video	≥ 240 lines VHS
Audio	Audio	Audio SP:	80Hz – 10kHz (±8dB)
		Audio LP:	80Hz – 5kHz (±8dB)
		FM Audio:	20Hz – 20kHz (±3dB)

Safety instructions

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.

  Safety components are marked by the symbol ⚠

- All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair may reduce life drastically. When repairing, make sure that you are conneted with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools on the same potential.
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- Never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to prelude short-circuit or to prevent a specific circuit from being rendered unstable.

Remarks

- The direct voltages and oscillograms ought to be measured relative to the set mass.
  EXCEPTION
  At the power supply, the DC voltages and the oscillograms at the primary side are measured to LIVE GND.
- The direct voltages and oscillograms mentioned in the diagrams ought to be measured with a colour bar signal and the picture carrier at 503.25 MHz (C25).
- The oscillograms and direct voltages have been measured in RECORD or PLAY mode.
- The semiconductors, which are mentioned in the circuit diagram and in the parts lists, are fully exchangeable per position with the semiconductors in the set, irrespective of the type designation of these semiconductors.

Sicherheitshinweise

- Die Sicherheitsvorschriften erfordern es, daß sich das Gerät nach der Reparatur in seinem originalen Zustand befindet und daß die zur Reparatur benutzten Ersatzteile mit den Originalersatzteilen identisch sind.

  Sicherheits-Bauteile sind mit der Markierung ⚠ versehen

- Alle IC's und Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD). Unvorschriftmässige Behandlung von Halbleitern im Reparaturfall kann zur Zerstörung dieser Bauteile oder zu einer drastischen Reduzierung der Lebensdauer führen. Sorgen Sie dafür, daß Sie sich im Reparaturfall über ein Armband mit Widerstand auf dem gleichen Potential, wie die Masse des Gerätes befinden. Alle Bauteile, Werkzeuge und Hilfsmittel sind auf das gleiche Potential zu legen.
- Ein zu reparierendes Gerät ist immer über einen Trenntransformator an die Netzspannung anzuschließen.
- Bei eingeschaltetem Gerät dürfen keine Module oder sonstige Einzelteile ausgetauscht werden.
- Zum Abgleich sind ausschließlich Kunststoffwerkzeuge zu benutzen (keine Metallwerkzeuge verwenden). Dadurch wird vermieden, daß ein Kurzschluß entstehen kann oder eine Schaltung instabil wird.

Anmerkungen

- Die Gleichspannung und Oszillogramme sind gegen Gerätemasse zu messen.
  AUSNAHME
  Beim Netzteil sind die Gleichspannungen und Oszillogramme auf der Primärseite gegen Live GND gemessen.
- Die Gleichspannungen und Oszillogramme angeführt in den Schaltbildern sollen unter folgenden Bedingungen gemessen werden: Farbbalkensignal, Bildträger auf 503.25 MHz (C25)
- Die Oszillogramme und Gleichspannungen sind in RECORD oder PLAY gemessen. Die in den Stücklisten aufgeführten Bauteile sind positionsweise voll auswechselbar gegen die Bauteile in dem Gerät, ungeachtet der etwaigen Typenbezeichungen.

Avertissements

- Les normes de sécurité exigent qu'aprés réparation l'appareil soit remis dans son état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées.

  Les composants de sécurité sont marqués ⚠

- Tout les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharger statiques (ESD). Leur longévité pourrait étre considérablement écourté par le fait qu'aucune précaution n'est prise à leur manipulation. Lors de réparations s'assurer de bien étre relié au méme potential que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.
- Toujours alimenter un appareil à réparer à travers un transfo d'isolement.
- Ne jamais remplacer les modules ni d'autres composants quand l'appareil est sous tension.
- Pour l'ajustage, utiliser des outils en plastique au lieu d'instruments métalliques. Ceci afin d'éviter les court-circuits et exclure l'instabilité dans certains circuits.

Observations

- La mésure des tensions continues et des oscillogrammes doit se faire par rapport à la terre de l'appareil.
  EXCEPTION
  Sur l'unité d'alimentation la tension continue et l'oscillogramme sont mesurés sur le côte primaire en Live GND.
- La mésure des tensions continues et des oscillogrammes figurant sur le schéma doit se faire dans un signal de barre couleur porteuse image sur 503.25 MHz (C25).
- Les oscillogrammes et tension sont mésurées en mode RECORD ou PLAY.
- Les semi-conducteurs indiqués dans le schéma de principe et à la liste des compostants, sont interchangeables par repère sur ce chassis avec les semi-conducteurs de l'appareil quelle que soit la désignation de type donnée sur ces semi-conducteurs.

Veiligheidsinstructies

- Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, indentiek aan de oorspronkelijke, worden toegepast.

  De veiligheidsonderdelen zijn aangeduid met het symbool ⚠

- Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor, dat U tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.
- Sluit een apparaat dat gerepareerd wordt altijd via een scheidingstransformator aan op de netspanning.
- Verwissel nooit modules of andere onderdelen terwijl het apparaat is ingeschakeld.
- Gebruik voor het afregelen plastic i.p.v metalen gereedschap. Dit om mogelijke kortsluiting te voorkomen of een bepaalde schakeling instabiel te maken.

Opmerkingen

- De gelijksspanningen en oscillogrammen dienen gemeten te worden ten opzichte van de apparaat aarde.
- De gelijksspanningen en oscillogrammen vermeld in de schema's dienen gemeten te worden met een kleurbalkensignaal beelddraaggolf op 503.25 MHz (C25).
- De oscillogrammen en gelijksspanningen zijn in RECORD of PLAY mode gemeten.
- De halfgeleiders, die in het pricipeschema en in de stuklijsten, zijn vermeld, zijn per positie volledig uitwisselbaar met de halfgeleiders in het apparaat, ongeacht de typeaanduiding op deze halfgeleiders.

Avvertimenti

- Le prescrizioni di sicurezza richiedono che l'apparecchio sia ricondotto alle condizioni originali e che siano usati ricambi originali.

  Componenti di sicurezza sono marcati con ⚠

- Tutti gli IC e semiconduttori sono sensibili a scariche elettrostatiche (ESD). Noncuranze durante la riparazione di semiconduttori possono danneggiarli o condurre ad una riduzione drastica della durata. Durante la riparazione assicurarsi di essere collegati allo stesso potenziale attraverso un bracciale di protezione contro scariche elettrostatiche. Inoltre tenere anche tutti i componenti e gli attrezzi a questo potenziale.
- Apparecchi da riparare bisogna collegarli sempre via un trasformatore isolante (separatore) alla tensione normale.
- Non scambiare moduli o altri componenti quando l'apparecchio è in funzione.
- Per l'accordo usare soltanto attrezzi di plastica (non usare attrezzi metallici). Cosí si evitano cortocircuiti e collegamenti instabili.

Osservazioni

- Misurare le tensioni continue e gli oscillogrammi riferiendosi alla massa dell'apparecchio.
  ECCEZIONE
  Le tensioni continue e gli oscillogrammi dall'alimentatore sono misurati sulla parte primaria contro GND-Live.
- Le tensioni continue e gli oscillogrammi indicati negli schemi di collegamento devono essere misurati secondo le condizioni seguenti: segnale barre colore, portante dell'immagine su: 503.25 MHz (C25).
- Gli oscillogrammi e le tensioni continue sono misurati in RECORD o PLAYBACK.
- I componenti indicati nelle liste sono intercambiabili con quelli nell'apparecchio nonostante l'eventuale denominazione di modelli.

Avisos

- Las instrucciones de seguridad exigen que después de la reparación el aparato se encuentre en el estado original y que las piezas de repuesto, utilizadas para la reparación, sean idénticas a las originales.

  Los componentes de seguridad estan marcados con ⚠

- Todos los IC y semiconductores son sensibles a descargas electrostáticas (ESD). Un tratamiento no conforme a las instrucciones de semiconductores en caso de reparación, podría llevar a la destrucción de estos componentes, o a una reducción drástica de la duración. Tenga cuidado de que, en caso de reparación, estar al mismo potencial que la masa del aparato, por una pulsera con resistencia. Ponga todos los componentes, herramientas y recursos al mismo potencial.
- Para reparar un aparato hay que conectarlo siempre a la alimentación a traves de un transformador de aislamiento.
- Cuando un aparato está en marcha no pueden ser cambiados módulos u otras piezas de repuesto.
- Para los ajustes hay que utilizar exclusivamente herramientas de plástico (nunca herramientas metálicas). Así se evitaran cortocircuitos y circuitos inestables.

Notas

- Hay que medir las tensiones continuas y los oscilogramas contra la masa del aparato.
  UITZONDERING:
  Bij het netgedeelte zijn de gelijkspanningen en oscillogrammen aan de primaire kant tegen Live GND gemeten.
- Las tensiones continuas y los oscilogramas mencionados en los esquemas tienen que ser medidos de manera siguiente: señal barra de color portadora de imagen en 503.25MHz (C25)
- Los oscilogramas y las tensiones continuas son medidas en „RECORD" y „PLAYBACK"
- Los componentes mencionados en las listas se los puede cambiar por los componentes en el aparato, a pesar de eventuales designaciones de tipos.

Table of contents

3 Initial installation

Setting channel, date and time for the first time 10
Searching for a TV channel manually 10
Allocating decoder 11
Using a satellite receiver 11

4 Settings

Searching for TV channels automatically 12
Sorting and clearing of TV channels manually 12
Sorting TV channels automatically 13
Changing the time and date 13

5 Operating instructions

General information 14
Navigation in the main menu 14

6 Tape Manager (TM)

Adding a cassette to the Tape Manager 14
Editing recording title 15
Searching for recording title 15
Displaying contents of cassette 16
Searching for blank space on tape 16
Removing cassette from Tape Manager 16
Copying Tape Manager memory 17

7 Playback

Playing cassettes 17
Playing back NTSC cassettes 17
Displaying tape position 18
Display / reset tape position 18
Searching for tape position with picture (picture search) 18
Searching for tape position without picture (forward wind and rewind) 18
Searching automatically for tape position (index search) 19
Finding a blank position on tape automatically 19
Still picture / slow motion 19
Skipping commercials 19
Selecting picture setting (Smart Picture) 20

8 Removing picture interference

Optimizing tracking 20
Optimizing still picture 20
Cleaning video heads 21

9 Manual recording

Starting and stopping of recording manually 21
Starting recording manually and stopping automatically 22
Lining up manual recordings 22
Selecting the recording speed 22
Activate / deactivate direct recording 23
Making a direct recording 23
Recording automatically from a satellite receiver 24

10 Programmed recordings

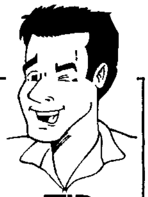
Programming timer with VIDEO Plus+ 24
Problem solving (VIDEO Plus-Programming) 25
Programming timer without VIDEO Plus+ 26
Problem solving (Timer programming) 27
"Turbo Timer"-Recording 27
Problem solving (Turbo Timer programming) 28
Delete / check / change programmed recordings 28
Using the NexTView Link 28

11 Other functions

Adjusting automatic switch-off 29
Adjusting the child lock 29
Replaying cassette continuously 29
Changing the TV system 30
Adjusting the OSD information 30
Audio recording 30
Dubbing (Audio Dubbing) 31
Selecting the sound channel 32
Selecting sound setting (Smart Sound) 32
Manual mute 32
Energy-saving mode 32
Preparing a synchronised re-recording (Synchro Edit) 33
Making a synchronised re-recording (Synchro Edit) 33
Adjusting Preroll time 34
Inserting recordings (Video Insert) 34
Adapting remote control 35
Demonstration mode 36
Adjusting the key illumination 36
Using the TV remote control 36
Optimizing the modulator 37
Switching the modulator on / off 37

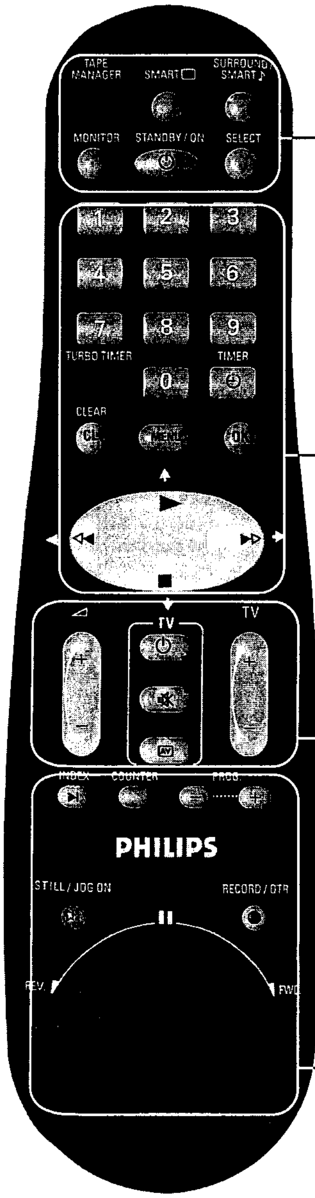
Remote control

You will find explanations for the controls and the displays on your video recorder on the second to last page of these operating instructions.



TIP

TAPE MANAGER	➤ Activate / deactivate Tape Manager
SMART ▢	➤ Select picture adjustment
SURROUND/SMART ♪	➤ Select sound setting
MONITOR	➤ Change between TV reception and video recorder reception
STANDBY/ON ⏻	➤ Switch set on / off ➤ Interrupt function ➤ Interrupt programmed recording
SELECT	➤ Select function



0-9	➤ Enter data ➤ Select programme number
TURBO TIMER	➤ Programme Turbo Timer recordings
TIMER ⏻	➤ Programme recordings ➤ Check / change recordings ➤ Delete recordings
CLEAR (CL)	➤ Delete TV channel / entry
MENU	➤ Switch main menu on / off
OK	➤ Store ➤ Confirm
↑ / ▶	➤ Play back recorded cassette ➤ Select next menu point ➤ Select next programme number
↓ / ■	➤ Stop tape ➤ Select previous menu point ➤ Select previous programme number
← / ◀◀	➤ Select entry field ➤ In STOP or STANDBY mode: Rewind ➤ In playback mode: Fast reverse
→ / ▶▶	➤ Select entry field ➤ In STOP or STANDBY mode: Wind forward ➤ In playback mode: Fast forward

TV functions

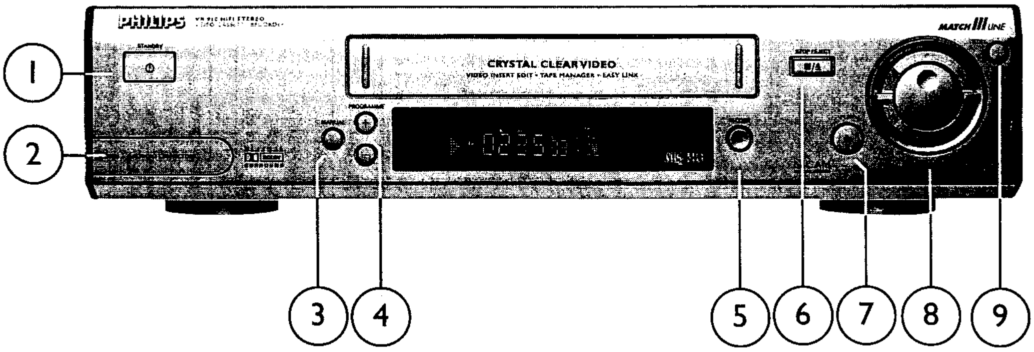
+ ◿ -	➤ Increase / reduce TV volume
TV / ⏻	➤ Switch TV on / off
TV / 🔇	➤ Switch TV sound on / off
TV / AV	➤ Change programme number "E 1" to scart socket AV1 EXT1
+ TV -	➤ Select next / previous programme number

INDEX ▶|	➤ With ◀◀ or ▶▶: Searching for index marking
COUNTER	➤ Display picture position
STILL / JOG ON ▶|◀	➤ Activate / deactivate Jog and Shuttle on the remote control ➤ Stop tape and show still picture
RECORD/OTR ●	➤ Starting recording manually

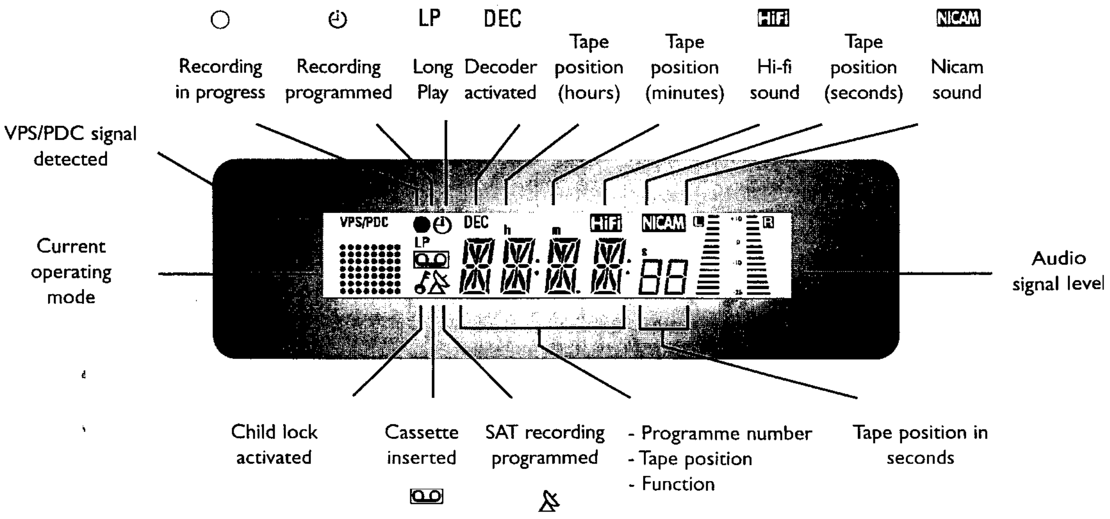
Accessories

- ✓ Operating instructions
- ✓ Quick Start Guide
- ✓ Remote control
- ✓ Batteries
- ✓ Aerial cable
- ✓ Mains cable
- ✓ Scart cable
- ✓ Coaxial cable (2x)

Video recorder / display


PHILIPS
CRYSTAL CLEARVIDEO
1
2
3
4
5
6
7
8
9

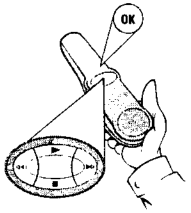
1 STANDBY/ON ⏻	➤ Switch set on/off
	➤ Interrupt function
	➤ Interrupt programmed recording
2 AUDIO/VIDEO IN	➤ Connecting the Camcorder, video recorder, sound source (Programme number "AUX" or "E3")
3 MANUAL	➤ Manual mute
4 PROGRAMME - / +	➤ Select previous/next programme number/menu point
5 RECORD ●	➤ Record
6 STOP/EJECT ■/▲	➤ During playback: Stop tape
	➤ In stop or standby mode: Eject tape
7 PLAY ▷	➤ Playback recorded cassette
8 ◁◀	➤ In stop or standby mode: Rewind tape
	➤ During playback: Reverse picture search
▶▷	➤ In stop or standby mode: Forward wind tape
	➤ During playback: Forward picture search
9 STILL ▶◀	➤ Still picture / slow motion


○
Recording in progress
⏻
Recording programmed
LP
Long Play
DEC
Decoder activated
Tape position (hours)
Tape position (minutes)
HiFi
Hi-fi sound
Tape position (seconds)
NICAM
Nicam sound
VPS/PDC signal detected
Current operating mode
Audio signal level
VPS/PDC
DEC
h
m
Child lock activated
Cassette inserted
SAT recording programmed
- Programme number
- Tape position
- Function
Tape position in seconds

3 Initial installation

Setting channel, date and time for the first time

If your TV set supports the Easylink function and you have already corrected and/or confirmed the settings for year, month, date and time, you can skip this section. Your video recorder has already stored all the necessary details. Please continue by reading the sub-section "Searching for a TV channel manually".



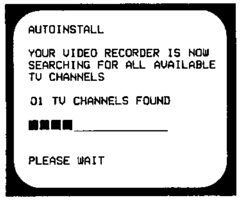
❶ Using the **OK** button activate the automatic initial installation

"Aim" correctly

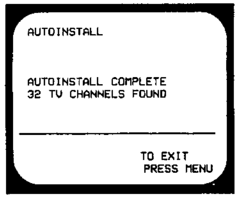
Always point the remote control at the video recorder and not at the TV set.

TIP

❷ The set seeks out and stores all available TV channels as well as time and date. This procedure may take several minutes.



```
AUTOINSTALL

YOUR VIDEO RECORDER IS NOW
SEARCHING FOR ALL AVAILABLE
TV CHANNELS

01 TV CHANNELS FOUND

■■■■____________

PLEASE WAIT
```



```
AUTOINSTALL


AUTOINSTALL COMPLETE
32 TV CHANNELS FOUND

________________________
                 TO EXIT
              PRESS MENU
```

✗ **Despite a continued search the video recorder finds no TV channels ("00 TV CHANNELS FOUND")**

✔ Please be patient! The video recorder will search through the entire frequency range in order to identify the maximum possible number of available TV channels. TV channels transmitted in your country may use a higher frequency band. As soon as this range is reached, the video recorder will find all available channels.

PROBLEM

❸ The initial setting of channel, date and time is completed

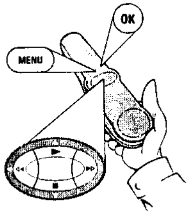
The Teletext clock resets automatically

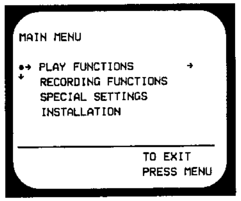
If a TV channel which has Teletext is stored as programme number P01, the video recorder automatically takes in the date and time from the text function. The change from summer to winter time and vice versa should also occur automatically.

TIP

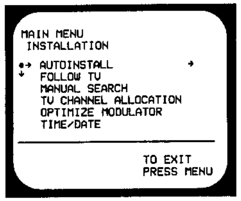
Searching for a TV channel manually

In exceptional cases, it may happen that on initial installation the set does not find all the available TV channels. In this case, the missing TV channels must be searched for and stored manually. If your set supports the Easylink function, you can start the automatic transfer of channel data by means of the following steps.

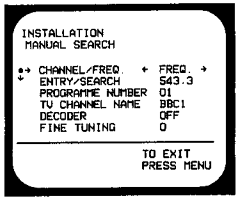




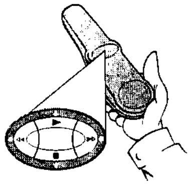
```
MAIN MENU

•→ PLAY FUNCTIONS           →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION

________________________
                 TO EXIT
              PRESS MENU
```



```
MAIN MENU
 INSTALLATION

•→ AUTOINSTALL              →
↓  FOLLOW TV
   MANUAL SEARCH
   TV CHANNEL ALLOCATION
   OPTIMIZE MODULATOR
   TIME/DATE
________________________
                 TO EXIT
              PRESS MENU
```



```
INSTALLATION
 MANUAL SEARCH

•→ CHANNEL/FREQ.     ←  FREQ. →
↓  ENTRY/SEARCH         543.3
   PROGRAMME NUMBER     01
   TV CHANNEL NAME      BBC1
   DECODER              OFF
   FINE TUNING          0
________________________
                 TO EXIT
              PRESS MENU
```



❶ Switch on the TV set and - if necessary - select the programme number set for video recorder operation

❷ Press the **MENU** button on the remote control. The on-screen menu appears

What is an on-screen menu?

The on-screen menu takes the mystery out of using your new video recorder. All settings and recording steps can be done easily via the on-screen menu by following the corresponding instructions on the screen.

PARDON?

❸ Use ↓ or ↑ to select the option "INSTALLATION" and confirm with →

❹ Use ↓ or ↑ to select the option "MANUAL SEARCH" and confirm with →

❺ Use ↓ or ↑ to select the option "CHANNEL/FREQ." and use → or ← (or **0-9**) to select the type of display desired.

What is hidden behind the settings?

"FREQ.":	The frequency display
"CH":	The channel display
"S-CH":	Entering a special channel

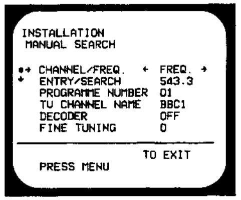
TIP

What is a channel, or a special channel?

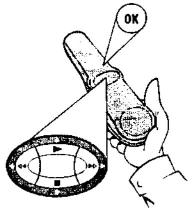
TV channels are transmitted on precisely-defined frequency ranges. These ranges are also referred to as "channels". Each channel has its own TV station allocated to it. Most cable and satellite TV providers supply tables of channel allocations. Special channels (hyperband channels) are transmitted on special frequencies.

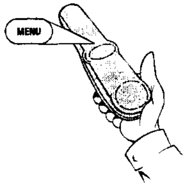
PARDON?

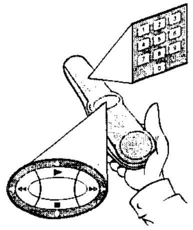
❻ If you already know the frequency or the channel of the TV station you are searching for, use ↓ or ↑ to select the option "ENTRY/SEARCH" and enter the frequency or the channel with the number buttons **0-9**



```
INSTALLATION
 MANUAL SEARCH

●→ CHANNEL/FREQ.   ←  FREQ. →
↓  ENTRY/SEARCH       543.3
   PROGRAMME NUMBER   01
   TV CHANNEL NAME    BBC1
   DECODER            OFF
   FINE TUNING        0
------------------------------
                    TO EXIT
   PRESS MENU
```







✗ **I don't know the channels for my TV stations**

✔ No problem. Hold down the button → to start the automatic channel search. A changing channel number will appear on screen. Continue the automatic channel search until you have found the desired TV station

PROBLEM

❼ Use ↓ or ↑ to select the option "PROGRAMME NUMBER" and use → or ← (or **0-9**) to select the programme position where you wish to store the TV station you have found

✗ **I cannot find the TV channels from my satellite receiver**

✔ These do not have to be stored as actual TV channels. On your video recorder, select programme number "E2". Individual TV channels must be selected on the actual satellite receiver itself

PROBLEM

❽ Store the TV channel you have found with the button **OK**. The screen will show the message "STORED"

❾ Finish manual searching of TV channels by pressing the **MENU** button or return to step ❻ to allocate additional TV channels

Allocating decoder

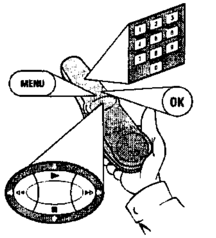
If your TV set supports the Easylink function you must allocate the decoder directly to the TV set. If necessary, you should refer to the instructions for your TV set for assistance. If your TV set does not support the Easylink function you must allocate the decoder to the TV set in the following manner.

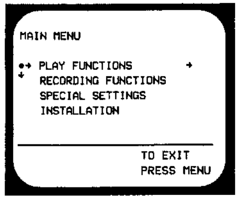
❶ Use ↓ and ↑ or the number keys **0-9** to select the TV channel, which will in future be automatically decoded by your decoder

What is a decoder?

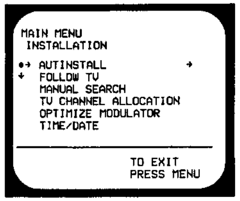
Like a deciphering machine, a decoder (available in TV and video stores) deciphers the TV channels for which additional charges must be paid. Without the appropriate decoder, you will receive these TV channels distorted.

PARDON?

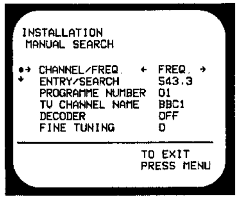




```
MAIN MENU

●→ PLAY FUNCTIONS          →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION
------------------------------
                    TO EXIT
                    PRESS MENU
```



```
MAIN MENU
 INSTALLATION

●→ AUTINSTALL              →
↓  FOLLOW TV
   MANUAL SEARCH
   TV CHANNEL ALLOCATION
   OPTIMIZE MODULATOR
   TIME/DATE
------------------------------
                   TO EXIT
                   PRESS MENU
```



```
INSTALLATION
 MANUAL SEARCH

●→ CHANNEL/FREQ.   ←  FREQ. →
↓  ENTRY/SEARCH       543.3
   PROGRAMME NUMBER   01
   TV CHANNEL NAME    BBC1
   DECODER            OFF
   FINE TUNING        0
------------------------------
                    TO EXIT
                    PRESS MENU
```

❷ Press the **MENU** button. The on-screen menu appears

What is an on-screen menu?

The on-screen menu takes the mystery out of using your new video recorder. All settings and recording steps can be done easily via the on-screen menu by following the corresponding instructions on the screen.

PARDON?

❸ Use ↓ or ↑ to select the option "INSTALLATION" and confirm with button →

❹ Use ↓ or ↑ to select the option "MANUAL SEARCH" and confirm with button →

❺ Use ↓ or ↑ to select the option "DECODER" and use → or ← to select the setting "ON" (Decoder activated) or "OFF" (Decoder deactivated)

❻ Confirm with **OK** and leave the on-screen menu with the **MENU** button. The screen will briefly show the message "STORED"

Check decoder allocation at a glance

There is no need to call up the on-screen menu to check to which TV channel on the video recorder a decoder is allocated. Simply use ↓ and ↑ to select a TV channel. If "DEC" appears in the display, a decoder is allocated to this channel.

TIP

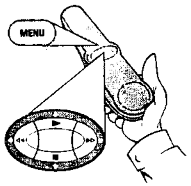
Using a satellite receiver

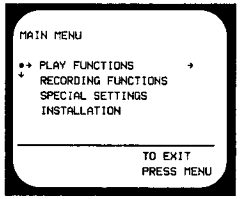
Those TV channels which are received via a satellite receiver connected (to the scart socket **AV2 EXT2**) can be viewed on the video recorder on programme number "E2". Press the number button **0** on the remote control and then the button ↓ to select this programme number. The TV channels of the satellite receiver are selected not on the video recorder itself, but directly on the satellite receiver.

4 Settings

Searching for TV channels automatically

On initial installation, the video recorder performs an automatic channel search. If the channel assignments of your cable or satellite TV provider change or if you are reinstalling the video recorder, e.g. after moving house, you can start this procedure again. The video recorder finds all the available TV channels and stores the new settings. If your set supports the Easylink function, you can start the automatic transfer of channel data by means of the following steps.

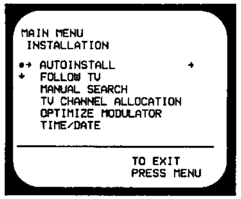




```
MAIN MENU

•→ PLAY FUNCTIONS        →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION
_____________________________
                 TO EXIT
                 PRESS MENU
```

❶ Switch on the TV set and - if necessary - select the programme number set for video recorder operation

❷ Press the **MENU** button on the remote control. The on-screen menu appears



```
MAIN MENU
 INSTALLATION
•→ AUTOINSTALL            →
↓  FOLLOW TV
   MANUAL SEARCH
   TV CHANNEL ALLOCATION
   OPTIMIZE MODULATOR
   TIME/DATE
_____________________________
                 TO EXIT
                 PRESS MENU
```

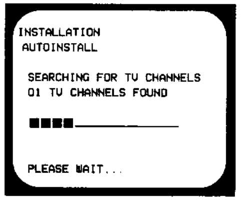
❸ Use ↓ or ↑ to select the option "INSTALLATION" and confirm with →

❹ Use ↓ or ↑ to select the option "AUTOINSTALL" (automatic channel search) and confirm with →

Sequence of TV channels

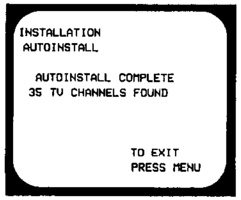
TV channels are stored in the following sequence: BBC1, BBC2, ITV, CH 4, CH 5, others.

TIP



```
INSTALLATION
 AUTOINSTALL

 SEARCHING FOR TV CHANNELS
 01 TV CHANNELS FOUND

 ■■■■______________

 PLEASE WAIT...
```

❺ The set seeks out and stores all available TV channels. This procedure may take several minutes



```
INSTALLATION
 AUTOINSTALL

  AUTOINSTALL COMPLETE
 35 TV CHANNELS FOUND



                TO EXIT
                PRESS MENU
```

❻ End the automatic channel search with the **MENU** button

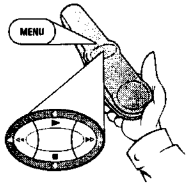
✗ **The video recorder is not finding all the TV channels**

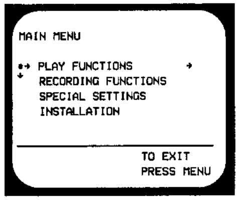
✔ In exceptional cases, it may happen that the set does not find all the available TV channels. In this case, the missing TV channels must be searched for and stored manually. You can look up how to do this in the chapter "Initial installation" ("Searching for a TV channel manually").

PROBLEM

Sorting and clearing of TV channels manually

After you have performed the automatic channel search you may not agree with the sequence in which the individual TV channels have been allocated to the programme positions of the video recorder. You can use this function to individually sort the TV channels found or to delete unwanted TV channels or those with poor reception. If your TV set supports the Easylink function, you will not need to rearrange the TV channels later. The sequence corresponds to the channel allocation of your TV set.

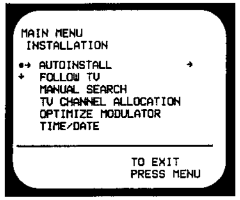




```
MAIN MENU

•→ PLAY FUNCTIONS        →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION
_____________________________
                 TO EXIT
                 PRESS MENU
```

❶ Switch on the TV set and - if necessary - select the programme number set for video recorder operation

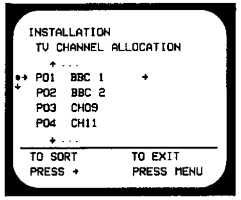
❷ Press the **MENU** button on the remote control. The on-screen menu appears



```
MAIN MENU
 INSTALLATION
•→ AUTOINSTALL            →
↓  FOLLOW TV
   MANUAL SEARCH
   TV CHANNEL ALLOCATION
   OPTIMIZE MODULATOR
   TIME/DATE
_____________________________
                 TO EXIT
                 PRESS MENU
```

❸ Use ↓ or ↑ to select the option "INSTALLATION" and confirm with →

❹ Use ↓ or ↑ to select the option "TV CHANNEL ALLOCATION" and confirm with →

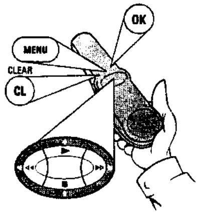


```
 INSTALLATION
  TV CHANNEL ALLOCATION
    ↑ . . .
•→ P01  BBC 1      →
↓  P02  BBC 2
   P03  CH09
   P04  CH11
    ↓ . . .
_____________________________
 TO SORT       TO EXIT
 PRESS →       PRESS MENU
```

❺ Use the buttons ↓ or ↑ to select the TV channel which is to be allocated to a programme position and confirm with →

❻ **Delete:** Delete the TV channel which has been set with **CLEAR (CL)**

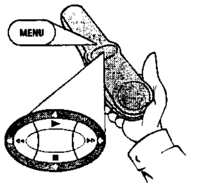
Sorting: Allocate the selected TV channels with the buttons ↓ or ↑ to the desired programme position and confirm with ←

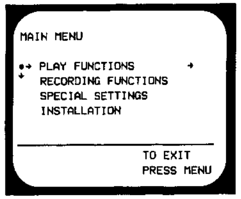


❼ Repeat the steps ❺ and ❻ to allocate additional TV channels or to delete additional unwanted TV channels

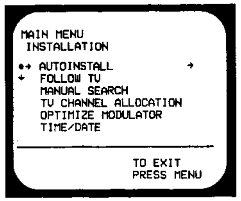
❽ Use **OK** to store and finish the manual sorting/clearing of TV channels with the **MENU** button (the screen will show the message "STORED")

Sorting TV channels automatically (Follow TV)

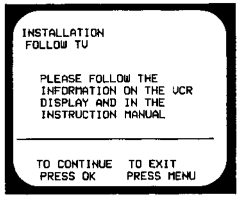




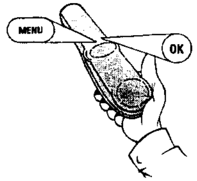
```
MAIN MENU

•→ PLAY FUNCTIONS         →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION

              TO EXIT
              PRESS MENU
```



```
MAIN MENU
 INSTALLATION

•→ AUTOINSTALL           →
↓  FOLLOW TV
   MANUAL SEARCH
   TV CHANNEL ALLOCATION
   OPTIMIZE MODULATOR
   TIME/DATE

              TO EXIT
              PRESS MENU
```



```
INSTALLATION
 FOLLOW TV

   PLEASE FOLLOW THE
   INFORMATION ON THE VCR
   DISPLAY AND IN THE
   INSTRUCTION MANUAL

 TO CONTINUE   TO EXIT
 PRESS OK      PRESS MENU
```



After you have performed the automatic channel search you may not agree with the sequence in which the individual TV channels have been allocated to the programme positions of the video recorder. With this function, the video recorder arranges the stored TV channels in the same sequence as on the TV set. If your TV set supports the Easylink function, you will not need to rearrange the TV channels later. The sequence corresponds to the channel allocation of your TV set.

How does "Follow TV" function?

The video recorder compares the TV channels stored on the TV set at programme position 01 with its own programme position memory. If it finds a match, it also allocates the corresponding TV channel to programme position 01

PARDON?

❶ Switch on the TV set and - if necessary - select the programme number set for video recorder operation

❷ Press the **MENU** button on the remote control. The on-screen menu appears

❸ Use ↓ or ↑ to select the option "INSTALLATION" and confirm with →

❹ Use ↓ or ↑ to select the option "FOLLOW TV" and confirm with →

❺ Press **OK**. The display will show "TV01".

❻ On the TV set select the corresponding programme number ("01") and confirm with **OK** on the remote control of the video recorder

❼ The video recorder stores the TV channel on the programme number "01". The display will show "TV02". Repeat step ❻ until all available TV channels are allocated

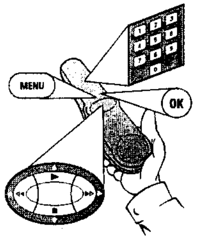
✗ **The screen will show "NOTV"**

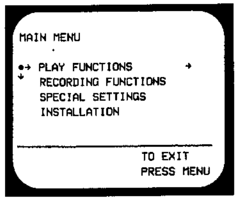
✔ Unfortunately your TV set does not support this function. Please read "Sorting / deleting channels manually ".

PROBLEM

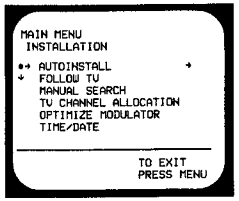
❽ Finish with the MENU button

Changing the time and date

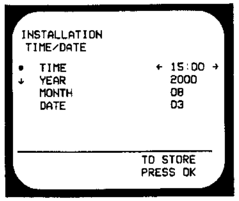




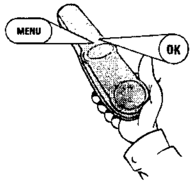
```
MAIN MENU

•→ PLAY FUNCTIONS         →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION

              TO EXIT
              PRESS MENU
```



```
MAIN MENU
 INSTALLATION

•→ AUTOINSTALL           →
↓  FOLLOW TV
   MANUAL SEARCH
   TV CHANNEL ALLOCATION
   OPTIMIZE MODULATOR
   TIME/DATE

              TO EXIT
              PRESS MENU
```



```
INSTALLATION
 TIME/DATE

•  TIME          ← 15:00 →
↓  YEAR            2000
   MONTH           08
   DATE            03

              TO STORE
              PRESS OK
```



If the display shows an incorrect time or "--:--", the time and date must be set manually.

❶ Press the **MENU** button on the remote control. The on-screen menu appears

❷ Use ↓ or ↑ to select the option "INSTALLATION" and confirm with →

❸ Use ↓ or ↑ to select the option "TIME/DATE" and confirm with →

Enter the values correctly

Numbers less than 10 must be entered with an additional "0". For "9" thus "09" should be entered.

TIP

❹ Use ↓ or ↑ to select the option "TIME" and - if the displayed setting is incorrect - enter the current time with the number buttons **0-9** or with → or ←

❺ Use ↓ or ↑ to select the option "YEAR" and - if the displayed setting is incorrect - enter the current year with the number buttons **0-9** or with → or ←

❻ Use ↓ or ↑ to select the option "MONTH" and - if the displayed setting is incorrect - enter the current month with the number buttons **0-9** or with → or ←

❼ Use ↓ or ↑ to select the option "DATE" and - if the displayed setting is incorrect - enter the current date with the number buttons **0-9** or with → or ←

❽ Check the settings displayed for year, month, date and time and store them by pressing **OK**. The display will show "STORED"

❾ Leave the on-screen menu with the **MENU** button

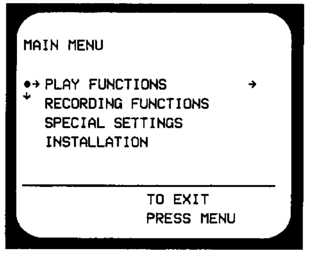
5 Operating instructions

General information

Switching on	If the video recorder is in standby mode, it can be switched on either by pressing the Standby button ⏻, by pressing one of the number buttons **0-9** or by inserting a cassette.
Automatic switch-off	If the video recorder is not used for several minutes, it switches itself off automatically. This function can be deactivated (e.g. if you want to use the video recorder as a TV receiver). You can find out more about this in the chapter "Other functions" ("Adjusting automatic switch off").
Energy consumption	The video recorder should always be connected to the mains so as not to affect programmed recordings and use of the TV set. Power consumption (in energy saving mode) is less than 4W.
Saving energy	In standby mode, the display of the video recorder shows the current time. This display can be deactivated manually, in order to reduce power consumption to a minimum in standby mode. You can find the necessary steps in the section "Other functions" ("Energy-saving mode").
Emergency exit	The video recorder and the remote control have the option of an "Emergency exit". You can use the Standby button ⏻ to interrupt any step during use. But even without an "emergency brake" your new video recorder is safe: there is no risk whatsoever of damaging the set by performing user steps incorrectly.
In the event of a power cut	Channel data are stored for around 1 year, time and timer data remain in the memory of the video recorder for around 7 hours.

Navigation in the main menu

You can check and / or change many functions and settings of your video recorder via the main menu. The individual functions are selected as follows via the on-screen menu of the video recorder



MAIN MENU

•→ PLAY FUNCTIONS →
↓ RECORDING FUNCTIONS
SPECIAL SETTINGS
INSTALLATION

TO EXIT
PRESS MENU

Call up:	**MENU**
Select:	**↑** and **↓** or **→**
Confirm:	**OK**
Enter:	**0-9**, or **→** and **←**
Interrupt:	**STANDBY/ON ⏻**
Abandon:	**MENU**

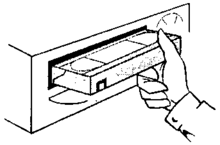
6 Tape Manager (TM)

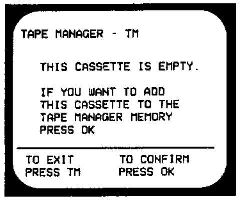
Adding a cassette to the Tape Manager

What is a Tape Manager (TM)?

This databank, which is integrated in your video recorder, makes a note of all recordings performed with this set. This means that by simply pressing a button, you can not only access an overview of your entire video collection, you will also know which film is on which cassette or how many minutes of this cassette have not yet been recorded on. And: At the touch of a button, the video recorder automatically winds backward or forwards to the start of a recording or to a blank part of the tape.

Pardon?





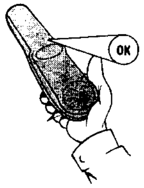
TAPE MANAGER - TM

THIS CASSETTE IS EMPTY.

IF YOU WANT TO ADD
THIS CASSETTE TO THE
TAPE MANAGER MEMORY
PRESS OK

TO EXIT
PRESS TM

TO CONFIRM
PRESS OK



❶ Switch on the TV set and - if necessary - select the programme number set for video recorder operation

❷ Insert a blank cassette which is ready for recording

Never use cassettes which have already been recorded on.

Warning: Only blank cassettes or those already included in the Tape Manager can be managed by the Tape Manager. Recordings made by other video recorders (without the Tape Manager function) will not be recognised by the Tape Manager.

TIP

❸ The inserted cassette will be searched for existing Tape Manager titles

❹ The screen will show the message "THIS CASSETTE IS EMPTY."

✗ **I can see a cassette number and an overview of the recordings on it.**

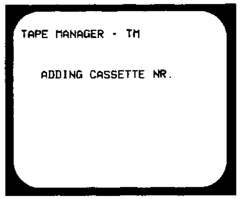
✓ You have inserted a cassette which has already been included in the Tape Manager and contains a recording. If there is still enough blank playing time on it, you can use this cassette for the current recording.

✗ **I cannot see any information about the content of the inserted cassette**

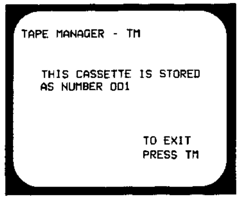
✓ Then it is a cassette which has been recorded by a different video recorder. This cassette cannot be included in the memory of the Tape Manager.

PROBLEM

❺ Press **OK** to allocate this cassette to the Tape Manager.



```
TAPE MANAGER - TM

  ADDING CASSETTE NR.
```



```
TAPE MANAGER - TM

  THIS CASSETTE IS STORED
  AS NUMBER 001


                    TO EXIT
                    PRESS TM
```

❻ The cassette will be assigned a number. Please write this number on the cassette accordingly. The Tape Manager may ask you, when searching for blank parts of a tape or for existing recordings, to insert the cassette with this number

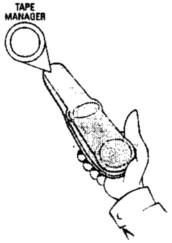
❼ The cassette is ejected. The video recorder will immediately recognise that this cassette is included in the Tape Manager. In future, after insertion, the number and cassette content will automatically be displayed on the screen

❽ Finish with the button **TAPE MANAGER**

Tape Manager can manage up to 150 cassettes

Up to 150 cassettes or up to 210 recording titles can be managed in the memory of the Tape Manager.

TIP

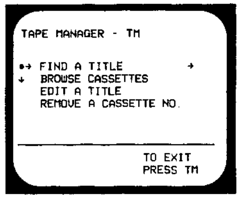


Edit recording title

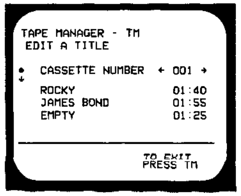
What is a recording title?

Each cassette entered in the Tape Manager has a "List of contents" that displays all the recordings on it. It shows the recording title and the duration of the corresponding recording. Some TV stations transmit the title of a programme. In this case, the title will be included automatically (e.g. "ROCKY"). If the title is not transmitted, only the date and time of the recording will appear in the list of contents. The title of the recording can only be changed after the completed recording has been entered. To do this, it is not necessary to insert the corresponding cassette.

PARDON?



```
TAPE MANAGER - TM

•→ FIND A TITLE          →
↓  BROWSE CASSETTES
   EDIT A TITLE
   REMOVE A CASSETTE NO.

                    TO EXIT
                    PRESS TM
```



```
TAPE MANAGER - TM
 EDIT A TITLE

•  CASSETTE NUMBER  ← 001 →
↓
   ROCKY              01:40
   JAMES BOND         01:55
   EMPTY              01:25

                    TO EXIT
                    PRESS TM
```

❶ On the remote control, press the button **TAPE MANAGER**

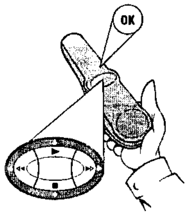
❷ Use ↓ or ↑ to select the option "EDIT A TITLE" and confirm with →

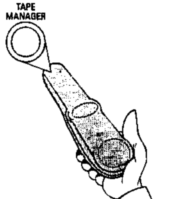
❸ The list of contents of a cassette included in the Tape Manager will be shown on the screen

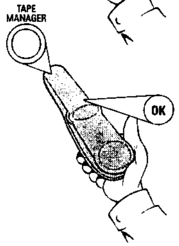
Display correct list of contents

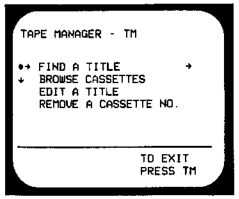
If there is a cassette in the video recorder which is included in the Tape Manager, the list of contents of this cassette will be displayed automatically.

TIP

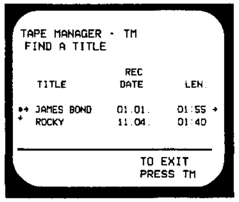








```
TAPE MANAGER - TM

•→ FIND A TITLE          →
↓  BROWSE CASSETTES
   EDIT A TITLE
   REMOVE A CASSETTE NO.

                    TO EXIT
                    PRESS TM
```



```
TAPE MANAGER - TM
 FIND A TITLE

                  REC
   TITLE          DATE       LEN.

•→ JAMES BOND     01.01.     01:55 →
↓  ROCKY          11.04.     01:40

                    TO EXIT
                    PRESS TM
```

❹ Select - if necessary - using → or ← the number of the cassette whose list of contents is to be revised

❺ Use ↓ or ↑ to select the recording title which you want to revise, and confirm with →

❻ Use → or ← to select the letters / digits to be altered and change them with the buttons ↓ or ↑

❼ Store, once all changes have been made, using the button **OK**

❽ Go back to step ❺, to revise additional recording titles, or finish with the button **TAPE MANAGER**

Searching for recording title

❶ On the remote control, press the button **TAPE MANAGER**

❷ Use ↓ or ↑ to select the option "FIND A TITLE" and confirm with →

❸ A list of all recording titles included in the Tape Manager will be displayed

❹ Use ↓ or ↑ to select the recording title which you want to play back, and confirm with **OK**

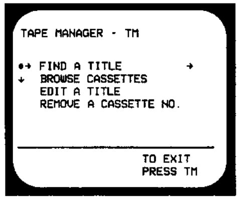
❺ The video recorder winds to the start of the recording selected and starts playback automatically

✗ **I can see the message "INSERT CASSETTE NUMBER XXXX"**

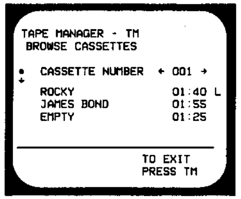
✓ The recording title selected is on the Tape Manager cassette with the number stated ("XXXX"). Please insert the corresponding cassette. The video recorder winds to the start of the selected recording and automatically starts playback.

PROBLEM

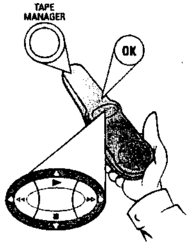
❻ If you want to end a search after the beginning of the selected recording, press the button **TAPE MANAGER**

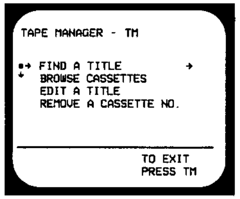


```
TAPE MANAGER - TM

•→ FIND A TITLE          →
↓  BROWSE CASSETTES
   EDIT A TITLE
   REMOVE A CASSETTE NO.

                 TO EXIT
                 PRESS TM
```

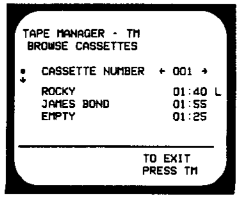


```
TAPE MANAGER - TM
BROWSE CASSETTES

↕  CASSETTE NUMBER  ← 001 →
   ROCKY              01:40 L
   JAMES BOND         01:55
   EMPTY              01:25

                 TO EXIT
                 PRESS TM
```





```
TAPE MANAGER - TM

•→ FIND A TITLE          →
↓  BROWSE CASSETTES
   EDIT A TITLE
   REMOVE A CASSETTE NO.

                 TO EXIT
                 PRESS TM
```



```
TAPE MANAGER - TM
BROWSE CASSETTES

↕  CASSETTE NUMBER  ← 001 →
   ROCKY              01:40 L
   JAMES BOND         01:55
   EMPTY              01:25

                 TO EXIT
                 PRESS TM
```

Displaying contents of cassette

1. On the remote control, press the button **TAPE MANAGER**
2. Use ↓ or ↑ to select the option "BROWSE CASSETTES" and confirm with →
3. The list of contents of a cassette included in the Tape Manager will be shown on the screen

> ✗ **I can see the text "THIS CASSETTE" and "TM-MEMORY"**
>
> ✔ You have inserted a cassette which is not included in the Tape Manager. Use ↓ or ↑ to select
>
> "THIS CASSETTE" Search the inserted cassette. Continue with step ⑤ and confirm with →.
>
> "TM-MEMORY" Search all cassettes included in Tape Manager. Continue with step ④ and confirm with →.
>
> **PROBLEM**

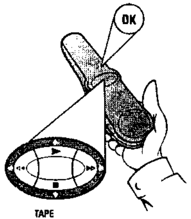
4. If necessary, you can use → or ← to page through the catalogue of cassettes included in the Tape Manager
5. **Delete:** Use ↓ or ↑ to select the corresponding recording title "EMPTY" and confirm with **OK**

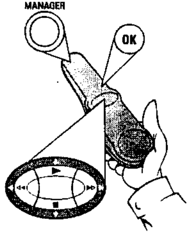
Finish: Press **TAPE MANAGER**

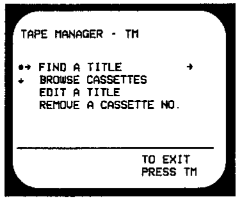
Searching for blank space on tape

1. On the remote control, press the button **TAPE MANAGER**
2. Use ↓ or ↑ to select the option "BROWSE CASSETTES" and confirm with →
3. The list of contents of a cassette included in the Tape Manager will be shown on the screen

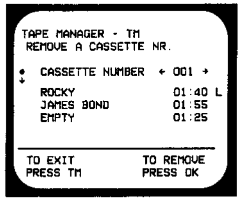
> ✗ **I can see the text "THIS CASSETTE" and "TM-MEMORY"**
>
> ✔ You have inserted a cassette which is not included in the Tape Manager. Use ↓ or ↑ to select "THIS CASSETTE" or "TM-MEMORY" and confirm with →
>
> **PROBLEM**



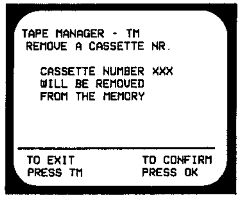




```
TAPE MANAGER - TM

•→ FIND A TITLE          →
↓  BROWSE CASSETTES
   EDIT A TITLE
   REMOVE A CASSETTE NO.

                 TO EXIT
                 PRESS TM
```



```
TAPE MANAGER - TM
REMOVE A CASSETTE NR.

↕  CASSETTE NUMBER  ← 001 →
   ROCKY              01:40 L
   JAMES BOND         01:55
   EMPTY              01:25

TO EXIT          TO REMOVE
PRESS TM         PRESS OK
```



```
TAPE MANAGER - TM
REMOVE A CASSETTE NR.

   CASSETTE NUMBER XXX
   WILL BE REMOVED
   FROM THE MEMORY

TO EXIT          TO CONFIRM
PRESS TM         PRESS OK
```

4. If necessary, use → or ← to select the number of the cassette which has enough remaining playing time ("EMPTY")
5. Use ↓ or ↑ to select the option "EMPTY" and confirm with **OK**
6. The video recorder winds to the start of the blank space on the tape and stops the tape

> ✗ **I can see the message "INSERT CASSETTE NUMBER XXX"**
>
> ✔ The blank space selected on the tape is in the Tape Manager cassette with the number stated ("XXX"). Please insert the corresponding cassette. The video recorder winds to the start of the blank space on the tape and stops the tape.
>
> **PROBLEM**

Removing cassette from Tape Manager

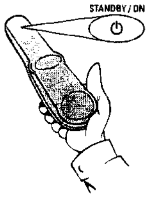
Cassettes included in the Tape Manager can be removed from the memory. To do this, the corresponding cassette does not have to be in the video recorder.

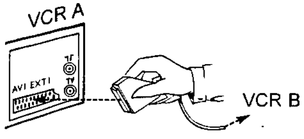
1. On the remote control, press the button **TAPE MANAGER**
2. Use ↓ or ↑ to select the option "REMOVE A CASSETTE NR." and confirm with →
3. The list of contents of a cassette included in the Tape Manager will be shown on the screen
4. If necessary, use → or ← to select the cassette number to be removed from the memory of the Tape Manager and confirm with **OK**
5. The screen will show "CASSETTE NUMBER XXX WILL BE REMOVED FROM THE MEMORY". Confirm with **OK** or interrupt with the button **TAPE MANAGER**

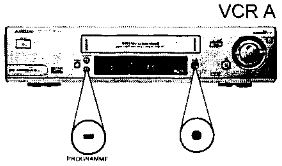
> **Cassette content will not be deleted!**
>
> The cassette will only be removed from the memory of the Tape Manager. The content will remain unaltered!
>
> **TIP**

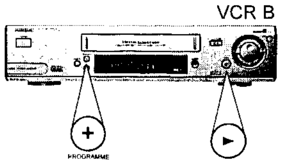
6. Finish with the button **TAPE MANAGER**

Copying Tape Manager memory









If you no longer wish to use a video recorder (henceforth referred to as VCR A), but would still like to use your Tape Manager archive, you can transfer the content of the memory to a second video recorder (henceforth referred to as VCR B). Requirements: 1. VCR B must also be equipped with a Tape Manager System, 2. The memory of the Tape Manager of VCR B must be empty.

❶ Make sure there are no cassettes in either of the two video recorders and switch VCR A and VCR B off using the Standby button ⏻

❷ Take a scart cable and connect the scart socket **AV1 EXT1** on the back of VCR A with the scart socket **AV1 EXT1** on the back of VCR B

❸ On the front of VCR A, press simultaneously the Record button **RECORD ●** and the button **PROGRAMME -**

❹ On the front of VCR B simultaneously press the Playback button **PLAY ▶** and the button **PROGRAMME +**

❺ The data in the Tape Manager will be copied from VCR A to VCR B. This may take several minutes. As soon as the copying procedure has been completed, the display will show "OK"

✗ **"NO E" appears in the display of VCR B**

✔ Cassettes had already been included in the Tape Manager of VCR B. It is not possible to perform the copying procedure. Press the Standby button ⏻ to finish this function

✗ **"NO I" appears in the display of VCR B**

✔ There are no cassettes included in the Tape Manager of VCR A. Press the Standby button ⏻ to finish this function

✗ **"ERR" appears in the display of VCR B**

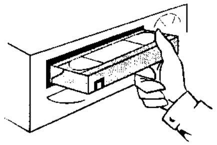
✔ The copying procedure cannot be performed. Perform steps ❶ to ❺ again

PROBLEM

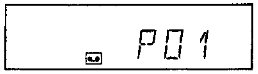
❻ Both video recorders switch off automatically. The data in the Tape Manager have been successfully transferred.

7 Playback

Playing cassettes



❶ Insert a VHS cassette in the cassette opening on the front of the video recorder. The tape will be caught and automatically placed in the correct position. The display will show "📼"

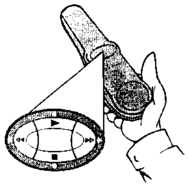


What does VHS mean?

The "Video Home System" (VHS) has become the world-wide standard for recording and playback of amateur video cassettes. The popular standard has since been refined. Super-VHS (S-VHS) offers greater sharpness and less noise, Digital-VHS (D-VHS) now only works with digital picture and sound signals. Your video recorder can only record and play standard VHS cassettes.

PARDON?

❷ Press the Playback button ▶ to play the tape



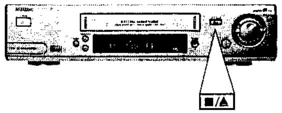
✗ **Picture / sound quality is poor**

✔ Please read the chapter "Removing picture interference".

✔ When playing many rental videos or older, poorer quality cassettes, it may not be possible to completely filter out picture and sound interference. There is nothing wrong with the video recorder.

PROBLEM

❸ Press the Stop button ■ on the remote control (or the Stop/Eject button ■/▲ on the front of the video recorder) to stop playback



❹ Press the Stop/Eject button ■/▲ on the front of the video recorder to remove the tape

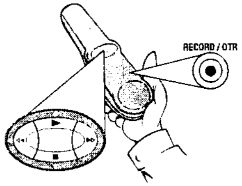
Automatic switch-off

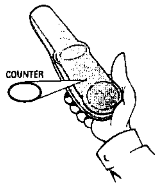
Many functions (pause, still picture, search, ...) switch themselves off automatically after a short time in order to protect the cassette and to save energy.

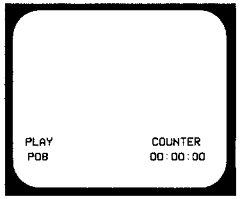
TIP

Playing back NTSC cassettes

If you are using a PAL TV set which is capable of showing a frame frequency of 60 Hz, you can play cassettes which have been recorded on the NTSC standard (USA, Japan, etc.). During an NTSC playback, some special functions (e.g. still picture) are not possible. The display will show "60HZ"







Displaying tape position

If the **COUNTER** button is pressed during playback and recording the current tape position will be briefly displayed on the screen. There are three different types of display available.

❶ Start playback (Playback button ►) or recording (Record button ●)

❷ By pressing the button **COUNTER** the current tape position will be displayed on the screen. Each further press of the button **COUNTER** activates the next type of display

What types of display are available to me?

"COUNTER":	The display shows the number of minutes of tape already played after insertion of the cassette (hours/minutes/seconds)
"TIME LEFT":	The display shows the remaining playing time to the end of the cassette (hours/minutes)
"TIME USED":	The actual tape position (from the start of the tape to the present tape position) will be displayed.

PARDON?

❸ As soon as the button **COUNTER** has not been pressed for a few seconds, the display of the tape position disappears again.

✘ **The counter stops running when unrecorded places are found ("COUNTER" display type)**

✔ This is normal, and is necessary for technical reasons.

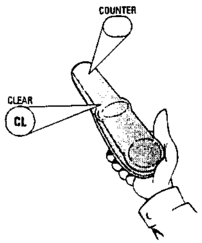
✘ **The display shows a negative playing time**

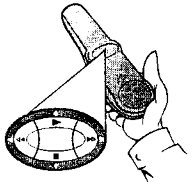
✔ This may happen, for example, when you insert an incompletely-rewound cassette into the video recorder and rewind it to the start of the tape. Since the display is automatically reset to "00:00:00" when you insert a cassette, the actual start of the cassette for the set is less than zero - thus in the negative range. The tape position is displayed with a minus sign "-".

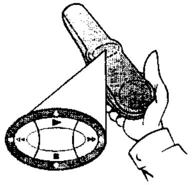
✘ **After inserting a cassette the video recorder shows no remaining playing time**

✔ The set needs a little time to calculate the remaining playing time. After a few seconds, the display should change from --:-- to the corresponding value

PROBLEM







Display / reset tape position

Call up: **COUNTER**

Reset: **CLEAR (CL)** (only in the "COUNTER" display mode)

Automatic reset

Whenever a cassette is inserted the display is automatically reset to "00:00:00".

TIP

Searching for tape position with picture (picture search)

❶ During playback press ◁◀ (rewind) or ▶▷ (forward)

❷ Interrupt the search wherever you like with the Playback button ►

Reduced quality

During picture search the picture quality is affected. The sound is switched off.

Different search speeds

If you press ◁◀ or Press ▶▷ twice, the tape speed will increase. Interrupt the search with the Playback button ►.

TIP

Searching for tape position without picture (forward wind and rewind)

❶ Stop the tape with the Stop button ■

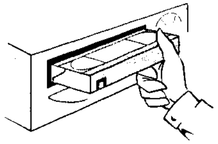
❷ Press ◁◀ (rewind) or ▶▷ (forward)

❸ Interrupt the search wherever you like with the Playback button ►

Switching between rewind / forward wind and picture search (instant view)

When winding the tape backwards or forwards if you hold down ◁◀ (rewind) or ▶▷ (forward wind), the set will immediately switch without a break to picture search (with picture). When you release the rewind or forward wind button the rewind or forward wind process (without picture) will continue

FOR EXPERTS



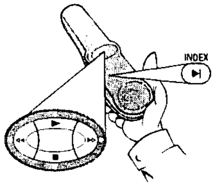
Searching automatically for tape position (index search)

❶ Insert a tape recorded on this video recorder or on another set with index marking

What is an index marking?

At the start of each new recording the video recorder automatically places a magnetic marking - similar to a bookmark - at the appropriate place on the tape. These positions can be found again quickly and easily later by pressing a button.

PARDON?



❷ Press the Index button ▶I and then ▶▷ (next index marking) or ◁◀ (previous index marking)

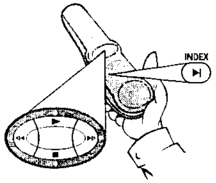
❸ The video recorder searches for the desired index marking and automatically switches to playback

✘ **The tape has been stopped**

✔ The video recorder was unable to find an index marking on the tape inserted.

PROBLEM

Finding a blank position on tape automatically



❶ Press the Index button ▶I and then the Stop button ■

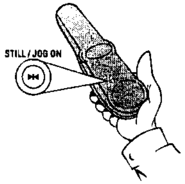
❷ The video recorder searches for the next blank part - longer than one minute - of the tape and automatically switches to pause

✘ **The cassette is ejected**

✔ The video recorder was unable to find any blank space on the tape inserted

PROBLEM

Still picture / slow motion



❶ To stop the picture, press the Still button ▶◀ during playback

❷ Keep ▶◀ pressed down to play back the picture in slow motion or press ▶◀ several times in succession in order to move the picture forward frame by frame

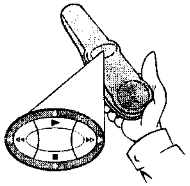
Continue playback

Press the Play button ►, to continue playback. Press the Stop button ■, to finish playback

TIP

Skipping commercials

Do you get annoyed by the commercial breaks which are recorded along with your programmes? With the function "Commercial Skip" you can skip these quickly and easily.



❶ During playback, press button ►

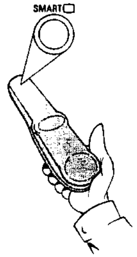
❷ The video recorder winds the tape forward for about 2 minutes playing time and then switches to playback again. Repeat step ❶ until the end of the commercial break has been reached

Interrupt "Commercial Skip"

During winding, press the button ► to switch back immediately to playback.

TIP

Selecting picture setting (Smart Picture)



Using the **SMART** ☐ button the picture settings can be displayed and altered. There are four different settings available.

1. Press once on the **SMART** ☐ button. The current picture setting will be displayed
2. Press several times on the **SMART** ☐ button to change the picture setting. Each time the button is pressed, the next picture setting will be displayed.

What types of picture setting are available to me?

"NATURAL" :	Standard setting (for all types of films)
"DISTINCT" :	Emphasises details (e.g. for sports programmes)
"SOFT" :	Suppression of interference (when using rented cassettes)
"SHARP":	Increase in sharpness (e.g. for animated films)

PARDON?

3. As soon as the **SMART** ☐ button has not been pressed for a few seconds, the last selected picture setting will be accepted.

Play compact VHS cassettes

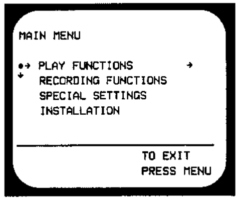
You can, of course, also use this video recorder to play back compact VHS cassettes. To do this, you will need the appropriate cassette adapter. Its dimensions match those of a normal VHS cassette. The adapter is recognised and treated by the set as a VHS cassette

FOR EXPERTS

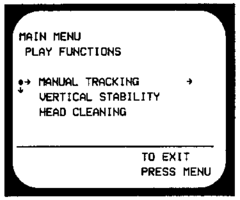
---

8 Removing picture interference

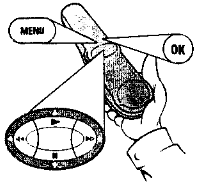
Optimizing tracking



```
MAIN MENU

•→ PLAY FUNCTIONS        →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION

                  TO EXIT
                  PRESS MENU
```



```
MAIN MENU
 PLAY FUNCTIONS

•→ MANUAL TRACKING       →
↓  VERTICAL STABILITY
   HEAD CLEANING

                  TO EXIT
                  PRESS MENU
```



1. During playback press the **MENU** button on the remote control. The on-screen menu appears
2. Use ↓ or ↑ to select the option "PLAY FUNCTIONS" and confirm with →
3. Use ↓ or ↑ to select the option "MANUAL TRACKING" and confirm with **OK**

What is tracking?

Tracking is the name given to the process of optimizing picture and sound playback. During this process the speed of the tape is adjusted in such a way that all kinds of interference are removed or (in the case of old VHS cassettes) minimised.

PARDON?

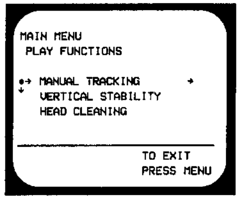
4. Hold down → or ← until optimal playback quality has been achieved and confirm with **OK**. The screen will show "STORED"
5. Leave the on-screen menu with the **MENU** button

Tracking adjustment is retained

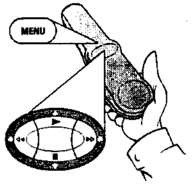
The adjustments made are stored until the cassette is removed. After that, the standard tracking adjustment is restored.

TIP

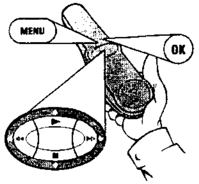
Optimizing still picture



```
MAIN MENU
 PLAY FUNCTIONS

•→ MANUAL TRACKING       →
↓  VERTICAL STABILITY
   HEAD CLEANING

                  TO EXIT
                  PRESS MENU
```



1. When still picture is activated, press the **MENU** button on the remote control. The on-screen menu appears
2. Use ↓ or ↑ to select the option "PLAY FUNCTIONS" and confirm with →
3. Use ↓ or ↑ to select the option "VERTICAL STABILITY" and confirm with **OK**



4 Hold down → or ← until optimal playback quality has been achieved and confirm with **OK**. The screen will show "STORED"

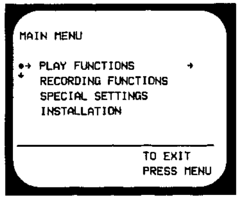
> ✗ **I can't get optimal quality**
>
> ✔ When using rental cassettes or older tapes, it may not be possible to get rid of all interference completely
>
> **PROBLEM**

5 Leave the on-screen menu with the **MENU** button

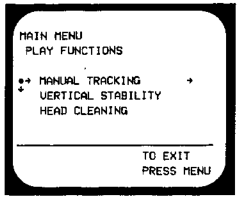
> **The setting is retained**
>
> The adjustments made are stored until the cassette is removed. Then the still picture standard setting is restored.
>
> **TIP**

Cleaning video heads

If horizontal lines of interference appear during playback, the video heads need cleaning.


MAIN MENU
→ PLAY FUNCTIONS →
RECORDING FUNCTIONS
SPECIAL SETTINGS
INSTALLATION
TO EXIT
PRESS MENU

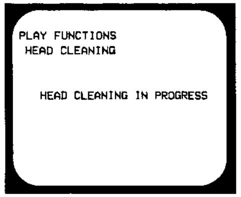
1 During playback press the **MENU** button on the remote control. The on-screen menu appears

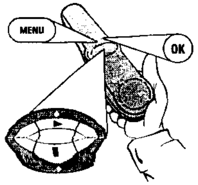

MAIN MENU
PLAY FUNCTIONS
→ MANUAL TRACKING →
VERTICAL STABILITY
HEAD CLEANING
TO EXIT
PRESS MENU

2 Use ↓ or ↑ to select the option "PLAY FUNCTIONS" and confirm with →

3 Use ↓ or ↑ to select the option "HEAD CLEANING"

> **Why is it necessary to clean the video heads?**
>
> When playing back video tapes, microscopic particles of the tape material build up a layer on the video head. If too much tape material collects, this can affect playback quality. By using the function "Clean video heads", this tape material can be gently removed from the surface of the video heads.
>
> **PARDON?**


PLAY FUNCTIONS
HEAD CLEANING
HEAD CLEANING IN PROGRESS



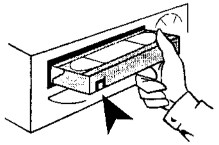
4 Press **OK**, to start the cleaning process. The screen will show "HEAD CLEANING IN PROGRESS"

5 Wait until the message disappears and leave the on-screen menu with **MENU**

9 Manual recording

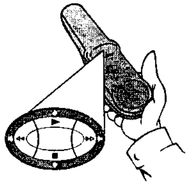
Starting and stopping of recording manually

1 Switch on the TV set and - if necessary - select the programme number set for video recorder operation



2 Insert a cassette without erase protection

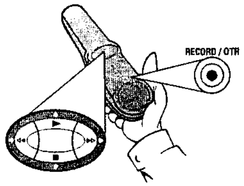
> **What is erase protection?**
>
> VHS cassettes can be protected from over-recording by breaking off a thin strip of plastic (arrow). This erase protection can be overridden by sticking one or more strips of adhesive tape tightly over the gap which has been created.
>
> **PARDON?**



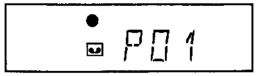
3 Use the buttons ↓ or ↑ to select the programme number, under which your video recorder has stored the desired TV channel

> ✗ **I can't find the TV channels from my satellite receiver**
>
> ✗ **I want to record from an additional device**
>
> ✔ Signals from additional devices - such as a camcorder, other video recorder, PCs, etc. - are received via the scart socket of the video recorder. The programme numbers "E1" and "E2" are allocated for these sources.
>
> **PROBLEM**

> **Selecting the recording speed**
>
> You have the option of two playback and recording speeds: Standard Play (SP) offers the usual first-class picture quality. By using Long Play (LP), you can (with somewhat reduced picture quality) for example record about 360 minutes of programmes on a 180 minute cassette. This chapter explains how to set the desired recording speed ("Selecting the recording speed").
>
> **FOR EXPERTS**

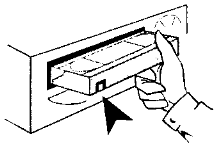


4 Start recording by pressing the Record button ● (remote control or on front of set). The display will show " ● ".



5 End the recording by pressing the Stop button ■

Starting recording manually / stopping automatically

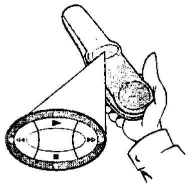


1. Insert a cassette without erase protection

What is erase protection?

VHS cassettes can be protected from over-recording by breaking off a thin strip of plastic (arrow). This erase protection can be overridden by sticking one or more strips of adhesive tape tightly over the gap which has been created.

PARDON?



2. Use the buttons ↓ or ↑ to select the programme number, under which your video recorder has stored the desired TV channel

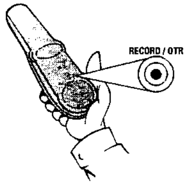
- ✗ **I can't find the TV channels from my satellite receiver**
- ✗ **I want to record from an additional device**
- ✓ Signals from additional devices - such as a camcorder, other video recorder, PCs, etc. - are received via the scart socket of the video recorder. The programme numbers "E1" and "E2" are allocated for these sources.

PROBLEM

Selecting the recording speed

You have the option of two playback and recording speeds: Standard Play (SP) offers the usual first-class picture quality. By using Long Play (LP), you can (with somewhat reduced picture quality) for example record about 360 minutes of programmes on a 180 minute cassette. This chapter explains how to set the desired recording speed ("Selecting the recording speed").

FOR EXPERTS

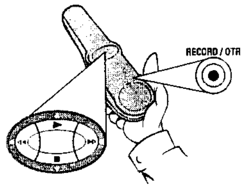


3. Press the Record button ● several times. The time faded in corresponds to the duration of recording to be selected. Each time the Record button is pressed again this is increased in regular steps (30 minutes). Stop the adjustment when you have reached the desired duration. Recording will start.

Delete entry

The recording period displayed can be reset to "00:00:00" with the **CL** button.

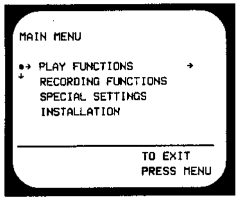
TIP

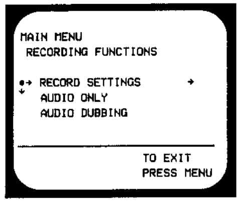


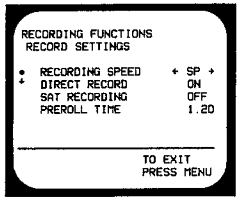
Lining up manual recordings

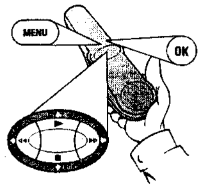
When you add a further recording to a cassette, which already has a recording on it, a short blank (flicker) usually appears between the old and the new recording. This is how to avoid such an effect.

1. Look at the last minute of the old recording (playback)
2. Press the Stop button ■ at the point where you want the new recording to start (the display will show **II**)
3. Press the Record button ● in the usual way, to start the new recording


MAIN MENU
●→ PLAY FUNCTIONS →
↓ RECORDING FUNCTIONS
SPECIAL SETTINGS
INSTALLATION
TO EXIT
PRESS MENU


MAIN MENU
RECORDING FUNCTIONS
●→ RECORD SETTINGS →
↓ AUDIO ONLY
AUDIO DUBBING
TO EXIT
PRESS MENU


RECORDING FUNCTIONS
RECORD SETTINGS
● RECORDING SPEED ← SP →
↓ DIRECT RECORD ON
SAT RECORDING OFF
PREROLL TIME 1.20
TO EXIT
PRESS MENU



Selecting the recording speed

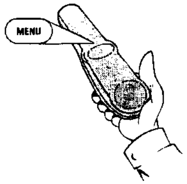
1. Press the **MENU** button on the remote control. The on-screen menu appears
2. Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →
3. Use ↓ or ↑ to select the option "RECORD SETTINGS" and confirm with →
4. Use ↓ or ↑ to select the option "RECORDING SPEED" and use → or ← to select a recording speed

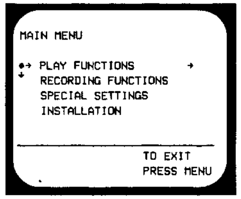
Standard Play / Long Play / Auto Long Play

Standard Play (SP) offers the usual, first-class picture quality. By using Long Play (LP), you can (with somewhat reduced picture quality) for example record about 360 minutes of programmes on a 180 minute cassette. With the Auto Long Play (AUTO) setting, the video recorder calculates, before starting the programmed recording, how much playing time remains on the cassette inserted. Depending on the calculated remaining playing time and the duration of the programmed recording, the recording will be made in Standard Play or Long Play.

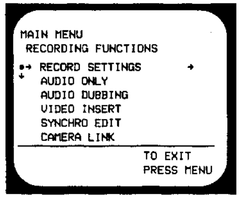
PARDON?

5. Confirm with **OK**. The screen will show "STORED"
6. Stop selection of recording speed with **MENU**

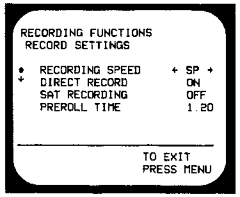




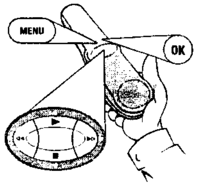
```
MAIN MENU

•→ PLAY FUNCTIONS            →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION

                   TO EXIT
                   PRESS MENU
```



```
MAIN MENU
 RECORDING FUNCTIONS
•→ RECORD SETTINGS           →
↓  AUDIO ONLY
   AUDIO DUBBING
   VIDEO INSERT
   SYNCHRO EDIT
   CAMERA LINK
                   TO EXIT
                   PRESS MENU
```



```
RECORDING FUNCTIONS
 RECORD SETTINGS

•  RECORDING SPEED        ← SP →
↓  DIRECT RECORD            ON
   SAT RECORDING            OFF
   PREROLL TIME             1.20

                   TO EXIT
                   PRESS MENU
```



Activate / deactivate direct recording

❶ Press the **MENU** button on the remote control. The on-screen menu appears

❷ Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →

❸ Use ↓ or ↑ to select the option "RECORD SETTINGS" and confirm with →

❹ Use ↓ or ↑ to select the option "DIRECT RECORD"

What is a "direct recording"?

The "Direct Record" function means you can record in seconds when the video recorder is switched off. When the Record button is pressed, the video recorder automatically recognises which TV channel has been selected on the TV set and starts to record the corresponding programme.
Requirements: 1. The TV set and video recorder are connected with a scart cable! 2. The TV set supports the "Easylink" function. 3. The "Direct Record" function has been activated in the on-screen menu. 4. There is a cassette ready for recording in the machine!

PARDON?

❺ Use → or ← to select the setting "ON" to enable direct recordings, or "OFF" to deactivate this function.

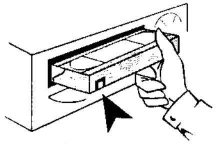
✗ **I cannot select "ON" or "OFF"**

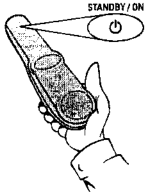
✓ If the comment "N.ACT." appears in the "DIRECT RECORD" option, unfortunately your TV set does not support the "Easylink" function. This means that direct recordings are not possible.

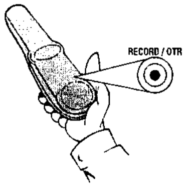
PROBLEM

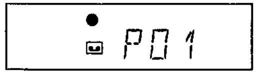
❻ Confirm the setting with **OK**. The screen will show "STORED"

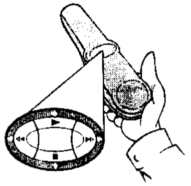
❼ Leave the on-screen menu with the **MENU** button











Making a direct recording

❶ The "Direct Record" function must be activated in the on-screen menu (see previous page). No direct recordings can be made unless this function has been activated

What is a "direct recording"?

The "Direct Record" function means you can record in seconds when the video recorder is switched off. When the Record button is pressed, the video recorder automatically recognises which TV channel has been selected on the TV set and starts to record the corresponding programme.
Requirements: 1. The TV set and video recorder are connected with a scart cable! 2. The TV set supports the "Easylink" function. 3. The "Direct Record" function has been activated in the on-screen menu. 4. There is a cassette ready for recording in the machine!

PARDON?

❷ Insert a cassette without erase protection

What is erase protection?

VHS cassettes can be protected from over-recording by breaking off a thin strip of plastic (arrow). This erase protection can be overridden by sticking one or more strips of adhesive tape tightly over the gap which has been created.

PARDON?

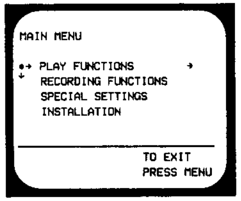
❸ Switch off the video recorder with the Standby button ⏻

❹ <u>On the TV set</u>, select the channel for the programme you wish to record

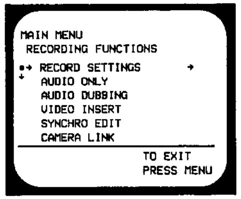
❺ Press the Record button ● <u>on the video recorder</u>. The video recorder recognises the TV channel on the TV set and automatically records the correct programme

❻ End the recording by pressing the Stop button ■

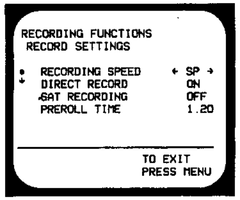
Recording automatically from a satellite receiver



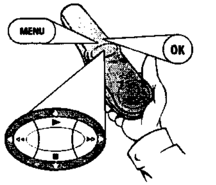
```
MAIN MENU

•→ PLAY FUNCTIONS          →
↓  RECORDING FUNCTIONS
   SPECIAL SETTINGS
   INSTALLATION

                   TO EXIT
                   PRESS MENU
```

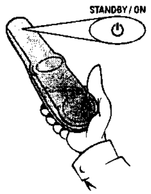


```
MAIN MENU
 RECORDING FUNCTIONS
•→ RECORD SETTINGS         →
↓  AUDIO ONLY
   AUDIO DUBBING
   VIDEO INSERT
   SYNCHRO EDIT
   CAMERA LINK
                   TO EXIT
                   PRESS MENU
```



```
RECORDING FUNCTIONS
 RECORD SETTINGS

•  RECORDING SPEED     ← SP →
↓  DIRECT RECORD         ON
   SAT RECORDING         OFF
   PREROLL TIME          1.20

                   TO EXIT
                   PRESS MENU
```





You can only use this function if you have a satellite receiver which can control other devices via a scart cable

What is a scart cable?

The scart or Euro-AV cable serves as the universal recording and playback connector for picture-, sound- and control signals. With this type of connection, there is practically no loss of quality during the signal transfer. We recommend that you use a scart cable when using this video recorder.

❶ Insert a cassette without erase protection

❷ Make sure that the satellite receiver is connected to the scart socket **AV1 EXT1** or **AV2 EXT2** at the back of the video recorder

❸ Press the **MENU** button on the remote control. The on-screen menu appears

❹ Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →

❺ Use ↓ or ↑ to select the option "RECORD SETTINGS" and confirm with →

❻ Use ↓ or ↑ to select the option "SAT RECORDING" and use → or ← to select the scart socket ("E1" or "E2"), to which the satellite receiver has been connected (see step ❷). Confirm with **OK**. The screen will show "STORED"

❼ Leave the on-screen menu with **MENU**

❽ Programme the data on the satellite receiver for the desired recording. If necessary, you should refer to the instructions for your satellite receiver for assistance.

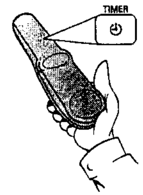
❾ **SWITCH OFF THE VIDEO RECORDER WITH THE STANDBY/ON BUTTON ⏻! IF YOU DON'T DO THIS, THE SET WILL NOT RECORD.**

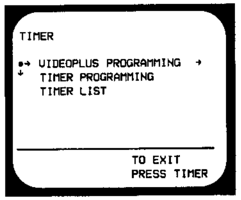
When automatic recording has been activated by a satellite receiver, "♨" will light up in the display

---

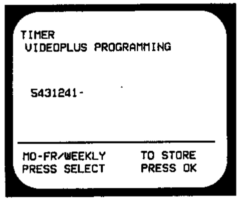
10 Programmed recordings

Programming timer with VIDEO Plus+

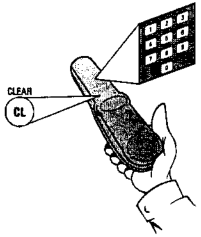


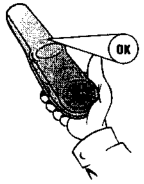


```
TIMER

•→ VIDEOPLUS PROGRAMMING   →
↓  TIMER PROGRAMMING
   TIMER LIST

                   TO EXIT
                   PRESS TIMER
```



```
TIMER
 VIDEOPLUS PROGRAMMING


  5431241-


MO-FR/WEEKLY       TO STORE
PRESS SELECT       PRESS OK
```





❶ Press the **TIMER** button ⏻

What is a Timer?

The timer controls the programmed recordings of your video recorder. Requirements for a timer which works correctly: The clock in the video recorder must be correctly set or the reception of the TV signal must be as free from interference as possible (for example, if there is interference, the video recorder might not correctly recognise the VPS signal of a TV channel).

❷ Use ↓ or ↑ to select the option "VIDEOPLUS RECORDING" and confirm with →. The VIDEO Plus+ screen will appear.

What is VIDEO Plus+?

A programming system which replaces the often tiresome entry of date, starting time, finish time and programme number by the simple entry of a number up to nine digits long (which can be found in any TV programme listing).

❸ Use the **0-9** keys to enter the PlusCode programming number of the TV programme selected: Incorrect entries can be deleted with the button **CL**

Daily / weekly recordings

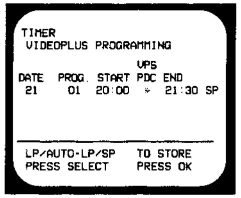
If you like, you can use SELECT "MO-FR" for recordings, which are repeated daily (Mon-Fri) or "WEEKLY" for recordings, which are repeated each week on the same day.

FOR EXPERTS

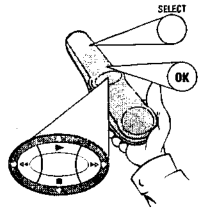
❹ Confirm with **OK**

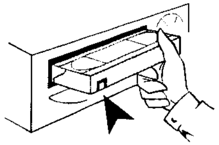
✗ **I get the error message "PROGRAMME NUMBER ← P-- →"**

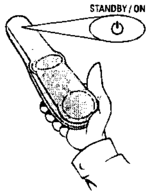
✔ You have entered a correct PlusCode programming number - but automatic recognition of the correct TV channel has failed. Please enter the programme number under which your video recorder has stored the desired TV channel using the buttons **0-9** and confirm with **OK**.



```
TIMER
 VIDEOPLUS PROGRAMMING
                     VPS
DATE  PROG. START PDC END
 21     01  20:00  *  21:30 SP

 LP/AUTO-LP/SP   TO STORE
 PRESS SELECT    PRESS OK
```







❺ The data of previously entered VIDEO Plus recordings are displayed. If necessary select the entry fields with with → or ← and enter date, programme number, start time or end time with ↓, ↑ or **0-9**

> **Activate VPS/PDC**
>
> VPS (Video Programming Service) and PDC (Programme Delivery Control) signals are transmitted by TV channels at the start and end of transmissions and ensure that programmes will be completely recorded, even if they are rescheduled. In the entry field, "START" use **SELECT** to switch recognition of these signals on (*) or off ( ).
>
> **Selecting the recording speed**
>
> You have the option of two playback and recording speeds: Standard Play (SP) offers the usual first-class picture quality, and with Long Play (LP) you can for example (with somewhat reduced picture quality) record about 360 minutes on a 180-minute cassette. In Auto Long Play (AUTO), the video recorder recognizes how much remaining playing time is available and automatically selects SP or LP. In the entry field "END" use **SELECT** to enter the required setting.
>
>
>
> FOR EXPERTS

❻ Confirm with **OK**. The screen will show "STORED"

❼ Insert a cassette without erase protection

> **What is erase protection?**
>
> VHS cassettes can be protected from over-recording by breaking off a thin strip of plastic (arrow). This erase protection can be overridden by sticking one or more strips of adhesive tape tightly over the gap which has been created.
>
>
>
> PARDON?

❽ SWITCH OFF THE VIDEO RECORDER WITH THE **STANDBY/ON** BUTTON ⏻! IF YOU DON'T DO THIS, THE SET WILL NOT RECORD.

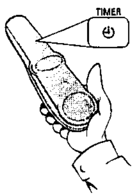
The display will show "⏻"

> YOU WILL FIND TIPS FOR SOLVING PROBLEMS TO DO WITH VIDEO PLUS RECORDING ON THE FOLLOWING PAGE.
>
>
>
> PROBLEM

Problem solving (VIDEO Plus-Programming)

PROBLEM	SOLUTION
Error message: "PLUSCODE NUMBER ← P-- →"	A correct PlusCode programming number has been entered - but automatic recognition of the correct TV channel has failed. Please enter the programme number under which your video recorder has stored the desired TV channel using the buttons **0-9** and confirm with **OK**.
Error message: "PLUSCODE NUMBER WRONG"	The Pluscode programming number entered is incorrect. Please repeat the entry or finish with the button **STANDBY/ON** ⏻.
Error message: "WEEKEND PROGRAMMING NOT POSSIBLE"	The attribute "MO-FR" has been selected for a recording at the weekend. This is only possible for recordings from Monday to Friday. Please repeat the entry or finish with the button **STANDBY/ON** ⏻.
Error message: "SWITCH TO STANDBY - TIMER RECORDING"	A recording was programmed, but the video recorder was not switched into timer mode with the Standby button ⏻. Press **STANDBY/ON** ⏻, in order to make the programmed recording. Warning: if you do not do this, the video recorder will not record.
Error message: "NO CASSETTE"	A recording was programmed, but there is no cassette in the machine. Insert a cassette without erase protection ready for recording.
Error message: "MEMORY FULL"	All the available memory locations in your video recorder for timer and VIDEO Plus programming are full. Delete a programmed recording (see chapter "Deleting a programmed recording").
"⏻" and/or "📼" flash in the display of the video recorder	A recording was programmed, but there is no cassette in the machine. Insert a cassette without erase protection ready for recording. A recording was programmed, but the video recorder was not switched into timer mode with the Standby button ⏻. Press **STANDBY/ON** ⏻, in order to make the programmed recording. Warning: if you do not do this, the video recorder will not record.
Cassette is ejected after programming	A cassette with erase protection was inserted. Please deactivate the erase protection or insert another cassette which is ready for recording.
Cassette is ejected during recording	The end of the tape was reached during a programmed recording. The recording could not be completed satisfactorily.
The set cannot be used during recording.	Once started, a recording can only be interrupted by pressing the **STANDBY/ON** button ⏻. WARNING: This will not only stop the recording, but it will also delete the programmed recording from the memory of the video recorder.
Year/month/date/time screen appears	The time has not been set or not set correctly. After entering/confirming year, month, date and time you can continue programming.

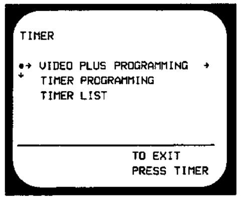
Programming timer without VIDEO Plus+



1. Press the button **TIMER** ⏻

2. Use ↓ or ↑ to select the option "TIMER RECORDING" and confirm with →

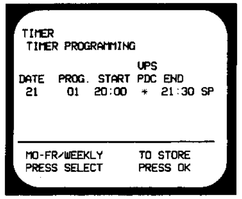
3. The timer screen appears



```
TIMER

•→ VIDEO PLUS PROGRAMMING   →
↓   TIMER PROGRAMMING
    TIMER LIST

                    TO EXIT
                    PRESS TIMER
```

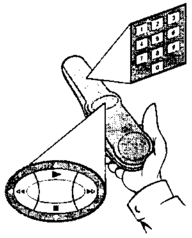
Enter the values correctly
Numbers less than 10 must be entered with an additional "0". For "9" thus "09" should be entered.
TIP

4. Use → or ← to select the entry field "DATE" and use ↓ or ↑ or the number buttons **0-9** to enter the date of the desired recording



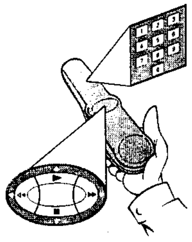
```
TIMER
 TIMER PROGRAMMING
                         VPS
DATE  PROG.  START  PDC  END
 21    01    20:00   *   21:30 SP


 MO-FR/WEEKLY      TO STORE
 PRESS SELECT      PRESS OK
```

Daily / weekly recordings
If you like, you can use **SELECT** "MO-FR" for recordings, which are repeated daily (Monday-Friday) or "WEEKLY" for recordings, which are repeated each week on the same day.
FOR EXPERTS



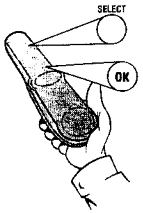
5. Use → or ← to select the entry field "PROG." and use ↓ or ↑ or the number buttons **0-9** to enter the programme number under which the video recorder has stored the desired TV channel

6. Use → or ← to select the entry field "START" and use ↓ or ↑ or the number buttons **0-9** to enter the start time of the desired recording



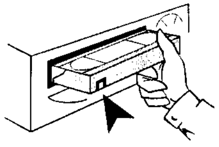
Activate VPS/PDC
VPS (Video Programming Service) and PDC signals (Programme Delivery Control) are transmitted by TV channels at the start and end of transmissions and ensure that programmes will be completely recorded, even if they are rescheduled. In the entry field, "START" use **SELECT** to switch recognition of these signals on (*) or off ( ).
FOR EXPERTS

7. Use → or ← to select the entry field "END." and use ↓ or ↑ or the number buttons **0-9** to enter the end time of the desired recording



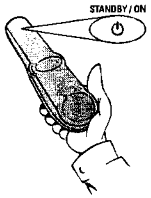
Selecting the recording speed
You have the option of two playback and recording speeds: Standard Play (SP) offers the usual first-class picture quality, and with Long Play (LP) you can for example (with somewhat reduced picture quality) record about 360 minutes on a 180-minute cassette. In Auto Long Play (AUTO), the video recorder recognizes how much remaining playing time is available and automatically selects SP or LP. In the entry field "END" use **SELECT** to enter the required setting.
FOR EXPERTS

8. Check that the date, programme number, start and finish time are shown correctly on the screen. Confirm with **OK**. The display will show "STORED"



9. Insert a cassette without erase protection

What is erase protection?
VHS cassettes can be protected from over-recording by breaking off a thin strip of plastic (arrow). This erase protection can be overridden by sticking one or more strips of adhesive tape tightly over the gap which has been created.
PARDON?



10. SWITCH OFF THE VIDEO RECORDER WITH THE **STANDBY/ON** BUTTON ⏻! IF YOU DON'T DO THIS, THE SET WILL NOT RECORD.
The display will show "⏻"

YOU WILL FIND TIPS FOR SOLVING PROBLEMS TO DO WITH TIMER RECORDING ON THE FOLLOWING PAGE.
PROBLEM

Problem solving (Timer programming)

PROBLEM	SOLUTION
Error message: "NO CASSETTE"	A recording was programmed, but there is no cassette in the machine. Insert a cassette without erase protection ready for recording.
Error message: "SWITCH TO STANDBY - TIMER RECORDING"	A recording was programmed, but the video recorder was not switched into timer mode with the Standby button. Press **STANDBY/ON** ⏻, in order to make the programmed recording. Warning: if you do not do this, the video recorder will not record.
"⏻" and/or "📼" flash in the display of the video recorder	A recording was programmed, but there is no cassette in the machine. Insert a cassette without erase protection ready for recording. A recording was programmed, but the video recorder was not switched into timer mode with the Standby button. Press **STANDBY/ON** ⏻, in order to make the programmed recording. Warning: if you do not do this, the video recorder will not record.
Error message: "MEMORY FULL"	All the available memory locations in your video recorder for timer and VIDEO Plus programming are full. Delete a programmed recording (see chapter "Delete / check / change programmed recordings").
Cassette is ejected during recording	The end of the tape was reached during a programmed recording. The recording could not be completed satisfactorily.
Cassette is ejected after programming	A cassette with erase protection was inserted. Please deactivate the erase protection or insert another cassette which is ready for recording.
The set cannot be used during recording	Once started, a recording can only be interrupted by pressing the **STANDBY/ON** button ⏻. WARNING: This will not only stop the recording, but it will also delete the programmed recording from the memory of the video recorder.
Year/month/date/time screen appears	The time has not been set or not set correctly. After entering/confirming year, month, date and time you can continue programming.

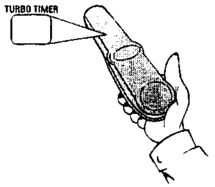
Recording via external sources

If you want to watch or record transmissions from a satellite receiver, films from a video camera (or from other external devices), connect the device to the scart socket **EXT1 AV1** or **EXT2 AV2** and select the programme number on your video recorder "E 1" or "E2".

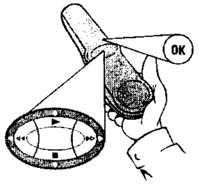
FOR EXPERTS

"Turbo Timer"-Recording

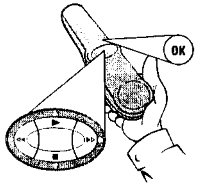
Using the "Turbo Timer", you can make a programmed recording within the next 24 hours quickly and simply, without having to switch on the TV set. All you need to do now is enter or confirm the desired programme number and start and finish time in the video recorder.



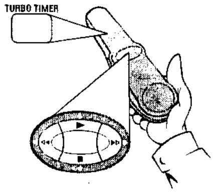
ST 17:30



EN 19:30



P01



❶ Press the **TURBO TIMER** button on the remote control.

❷ The display shows the actual starting time, e.g.: "20:00". Change – if necessary – the displayed start time with ↓ or ↑ (or with **0-9**).

Activate VPS/PDC

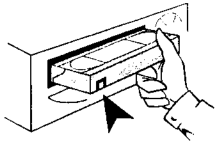
VPS (Video Programming Service) and PDC (Programme Delivery Control) signals are transmitted by TV channels at the start and end of transmissions and ensure that programmes will be completely recorded, even if they are rescheduled. Use **SELECT** to switch recognition of these signals on (VPS/PDC appears in the display) or off.

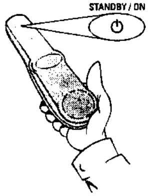
FOR EXPERTS

❸ Confirm with **OK**

❹ The display shows a suggestion for the end of the recording e.g.: "22:00" (Start time + 2 hours). Change – if necessary – the displayed finish time with ↓ or ↑ (or with **0-9**). Confirm with the **TURBO TIMER** button.

❺ The display shows the programme number to which the video recorder is currently set, e.g.: "P01". Change – if necessary – the displayed programme number with ↓ or ↑ (or with **0-9**). Confirm with the **TURBO TIMER** button. In the display there will briefly appear "OK"





❻ Insert a cassette without erase protection

What is erase protection?

VHS cassettes can be protected from over-recording by breaking off a thin strip of plastic (arrow). This erase protection can be overridden by sticking one or more strips of adhesive tape tightly over the gap which has been created.

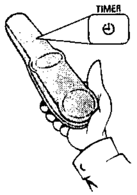
❼ SWITCH OFF THE VIDEO RECORDER WITH THE STANDBY/ON BUTTON ⏻! IF YOU DON'T DO THIS, THE SET WILL NOT RECORD.

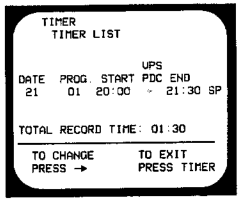
The display will show "⏻"

Problem solving (Turbo Timer programming)

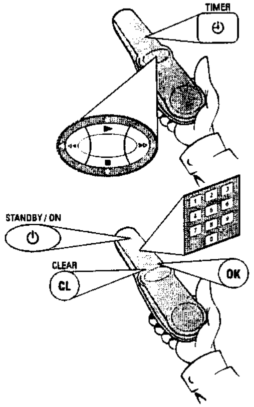
PROBLEM	SOLUTION
Error message: "COLLISION"	**It is impossible, to make another programmed recording at the same time as an earlier programmed recording. Please check the programmed recordings ("Delete / check / change programmed recordings ")**
"⏻" and "▭" will blink in the display	A recording was programmed, but there is no cassette in the machine. Insert a cassette without erase protection ready for recording.
Error message: "FULL"	All the available memory locations in your video recorder for timer and VIDEO Plus programming are full. Delete a programmed recording (see chapter "Delete/ check / change programmed recordings").
Cassette is ejected during recording	**The end of the tape was reached during a programmed recording. The recording could not be completed satisfactorily.**
Cassette is ejected after programming	A cassette with erase protection was inserted. Please deactivate the erase protection or insert another cassette which is ready for recording.
The set cannot be used during recording	**Once started, a recording can only be interrupted by pressing the STANDBY/ON button ⏻. WARNING: This will not only stop the recording, but it will also delete the programmed recording from the memory of the video recorder.**
Error message: "CLK"	The time has not been set or not set correctly. A Turbo Timer recording is not possible. Please enter the correct time (Section "Changing the time and date")

Delete / check / change programmed recordings





```
TIMER
 TIMER LIST

                     UPS
DATE  PROG.  START  PDC  END
 21    01    20:00   -   21:30 SP

TOTAL RECORD TIME: 01:30
_______________________________
 TO CHANGE          TO EXIT
 PRESS →            PRESS TIMER
```



❶ Press **TIMER** ⏻ on the remote control **twice**

❷ Use ↓ or ↑ to select the option "TIMER LIST" and confirm with →

❸ In the display, use the button ↓ or ↑ to select the storage position you wish to check/ change/delete

What is a memory location?

For technical reasons, your video recorder has access to a limited number of "drawers" in which you can store your programming requirements. "Drawers" occupied by programme recording details are only available for use again after the video recorder has successfully completed a programmed recording or if it has been manually deleted. Your video recorder can store up to six programmed recordings.

❹ **Delete:** Press **CLEAR (CL)**, confirm with the button **OK** (the screen will show "TIMER CLEARED") and finish with **TIMER** ⏻

Check: Press →, check the stored details and (once you have checked) end with **TIMER** ⏻

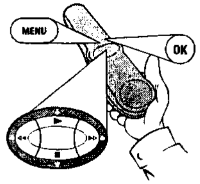
Change: Press →, use ↓ or ↑ to select the entry fields to be altered and use **0-9** to enter the new value(s). Confirm with **OK** and switch off the video recorder with the Standby button ⏻.

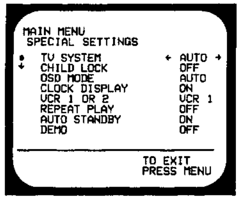
Using the "NexTView Link"

If your TV set supports the "NexTView Link" function, there is another option for you to quickly and simply programme recordings: With these TV sets, you can call up the listings for the TV channels, mark the programmes you want to record and automatically transfer their details into the memory of the video recorder. Please look in the instructions for your TV set to find out whether and how you can benefit from this function.

11

Other functions



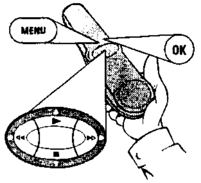


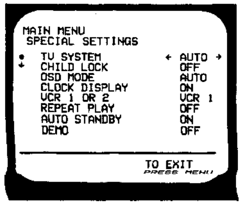
```
MAIN MENU
 SPECIAL SETTINGS
●   TV SYSTEM          ← AUTO →
↓   CHILD LOCK           OFF
    OSD MODE             AUTO
    CLOCK DISPLAY        ON
    VCR 1 OR 2           VCR 1
    REPEAT PLAY          OFF
    AUTO STANDBY         ON
    DEMO                 OFF
─────────────────────────────
                 TO EXIT
                 PRESS MENU
```

Adjusting automatic switch-off

If the video recorder is not used for several minutes, it switches itself off automatically. If you want to use the video recorder as a TV receiver, you can deactivate the automatic switch-off as follows:

1. Press the **MENU** button on the remote control. The on-screen menu appears
2. Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →
3. Use ↓ or ↑ to select the option "AUTO STANDBY" and use → or ← to select the setting "ON" (automatic switch-off) or "OFF" (no automatic switch-off). Confirm with **OK**
4. Complete the adjustment of automatic switch-off with the **MENU** button





```
MAIN MENU
 SPECIAL SETTINGS
●   TV SYSTEM          ← AUTO →
↓   CHILD LOCK           OFF
    OSD MODE             AUTO
    CLOCK DISPLAY        ON
    VCR 1 OR 2           VCR 1
    REPEAT PLAY          OFF
    AUTO STANDBY         ON
    DEMO                 OFF
─────────────────────────────
                 TO EXIT
                 PRESS MENU
```

Adjusting the child lock

You can prevent unauthorised use of your video recorder with this function. Once it is activated, the buttons on the front of the set are locked. Previously entered programmes will of course be recorded

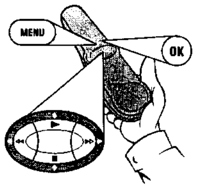
1. Press the **MENU** button on the remote control. The on-screen menu appears
2. Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →
3. Use ↓ or ↑ to select the "CHILD LOCK" and use → or ← to select the setting "ON" (Child lock on) or "OFF" (Child lock off). Confirm with **OK**

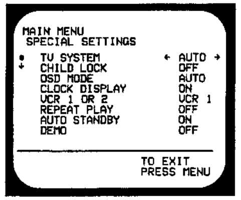
Put the remote control away in a safe place.

Once the child lock has been activated, ("🔑" lights up in the display) the video recorder can now only be used with the remote control. The buttons on the front of the set will not function. Put away the remote control somewhere out of the reach of children.

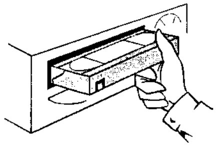
TIP

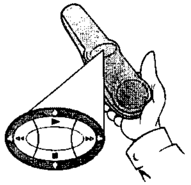
4. Finish with the **MENU** button





```
MAIN MENU
 SPECIAL SETTINGS
●   TV SYSTEM          ← AUTO →
↓   CHILD LOCK           OFF
    OSD MODE             AUTO
    CLOCK DISPLAY        ON
    VCR 1 OR 2           VCR 1
    REPEAT PLAY          OFF
    AUTO STANDBY         ON
    DEMO                 OFF
─────────────────────────────
                 TO EXIT
                 PRESS MENU
```





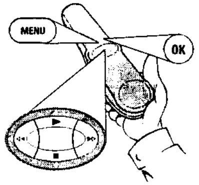
Replaying cassette continuously

This function can be used to play a tape over and over again. If the end of the cassette or of the recording has been reached, the video recorder automatically rewinds to the start of the tape and starts to play back again. This function is activated or deactivated as follows:

1. Press the **MENU** button on the remote control. The on-screen menu appears
2. Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →
3. Use ↓ or ↑ to select the option "REPEAT PLAY" and use → or ← to select the setting "ON" (continuous playback on) or "OFF" (continuous playback off). Confirm with **OK**
4. Complete the adjustment of continuous playback with the **MENU** button
5. Insert a cassette
6. Press the Playback button ▶ to start the playback or continuous playback (depending on the setting)

Changing the TV system

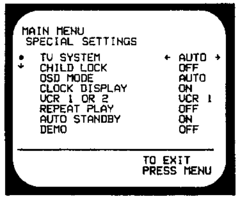
When playing back cassettes which have been recorded with signals from a different TV system there may be interference with the colour. To deactivate the automatic change to a different TV system, you must follow these steps.



TV systems

Other countries, other TV systems: In central Europe transmissions are broadcast in the PAL-System (Phase Alternation Line) Standard, while in France SECAM (Séquentiel à mémoire) is used. In some countries (USA and Japan), TV viewers receive their programmes as an NTSC signal (National Television System Committee). Many TV and video sets can process and show several transmission systems.

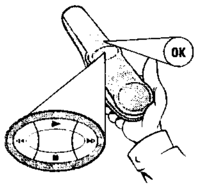
PARDON?



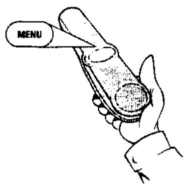
```
MAIN MENU
 SPECIAL SETTINGS
↕ TV SYSTEM       ← AUTO →
  CHILD LOCK        OFF
  OSD MODE          AUTO
  CLOCK DISPLAY     ON
  VCR 1 OR 2        VCR 1
  REPEAT PLAY       OFF
  AUTO STANDBY      ON
  DEMO              OFF

                 TO EXIT
               PRESS MENU
```

❶ Press the **MENU** button on the remote control. The on-screen menu appears

❷ Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →



❸ Use ↓ or ↑ to select the option "TV SYSTEM", use → or ← to select the desired TV system or "B/W" for black/white playback and confirm with **OK**



Reactivating automatic change-over

As soon as the cassette is ejected with the Stop/Eject button ■/▲ the set switches automatically back to the "AUTO" setting (automatic switching). To change the setting during playback, perform the steps ❶-❸ again and select "AUTO".

TIP

❹ End the change-over to automatic TV system changing with the **MENU** button

---

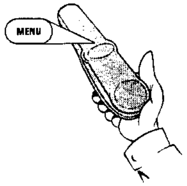
Adjusting the OSD information

If this function is activated, the current operating details of the video recorder will be briefly displayed on the screen

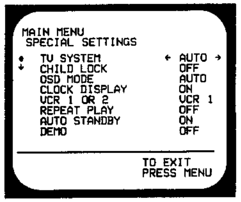
What is an OSD?

The on-screen menu or OSD ("On Screen Display") takes the mystery out of using your new video recorder. Using the main menu (MENU button on your remote control), all settings and recording steps can be done easily via the on-screen menu by following the corresponding instructions on the screen.

PARDON?



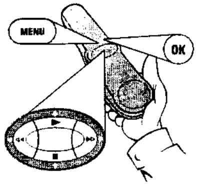
❶ During playback press the **MENU** button on the remote control. The on-screen menu appears



```
MAIN MENU
 SPECIAL SETTINGS
↕ TV SYSTEM       ← AUTO →
  CHILD LOCK        OFF
  OSD MODE          AUTO
  CLOCK DISPLAY     ON
  VCR 1 OR 2        VCR 1
  REPEAT PLAY       OFF
  AUTO STANDBY      ON
  DEMO              OFF

                 TO EXIT
               PRESS MENU
```

❷ Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →

❸ Use ↓ or ↑ to select the option "OSD MODE", use → or ← to select the desired setting and confirm with **OK**



What goes on behind the settings?

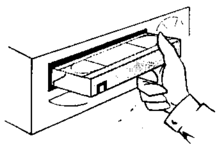
AUTO:	For each type of operation selected (playback, recording, etc.) the corresponding symbol appears briefly on the screen
ON:	The OSD details will be shown
OFF:	OSD information is not shown

TIP

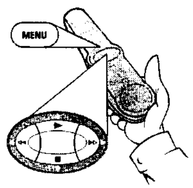
❺ Complete the adjustment of the OSD information with the **MENU** button

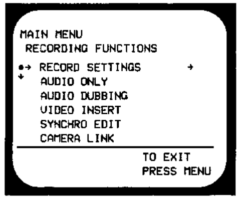
Audio recording

You can record audio signals (without picture) on VHS cassettes, if you connect the sound source with the scart or audio sockets of the video recorder. Only use cassettes, that are not included in the Tape Manager. The chapter "Tape Manager (TM)" explains how to remove cassettes from the Tape Manager memory.

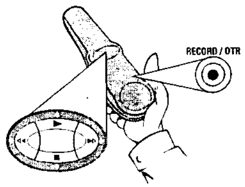


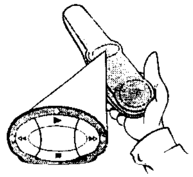
❶ Connect the desired sound source to the video recorder and insert a cassette ready for recording





MAIN MENU
RECORDING FUNCTIONS
●→ RECORD SETTINGS →
↓ AUDIO ONLY
AUDIO DUBBING
VIDEO INSERT
SYNCHRO EDIT
CAMERA LINK
TO EXIT
PRESS MENU





❷ Use ↓ or ↑ to select the corresponding programme number

Which is the correct programme number?

	Socket	*Programme number*
AV1 EXT1	(Rear)	E1
AV2 EXT2	(Rear)	E2
AUDIO	(Front)	E3
AUDIO IN	(Rear)	AUX

PARDON?

❸ Press the **MENU** button. The on-screen menu appears

❹ Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with the button →

❺ Use ↓ or ↑ to select the option "AUDIO ONLY" and confirm with →

❻ Press the Record button ● in the usual way to start the recording

❼ Press the Stop button ■ to end the recording

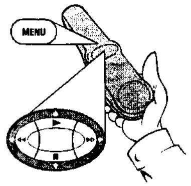
❽ Leave the on-screen menu with the **MENU** button

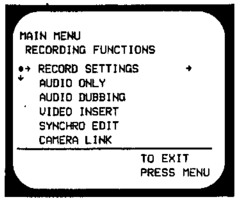
Dubbing (Audio Dubbing)

Of course, you can also dub existing video recordings with this video recorder. The mono track is recorded with a new sound signal. The original stereo signal is retained. To make dubbing audible during playback, you must select the "MIX" or "MONO" sound channel setting. Only use cassettes, that are not included in the Tape Manager. The chapter "Tape Manager (TM)" explains how to remove cassettes from the Tape Manager memory.

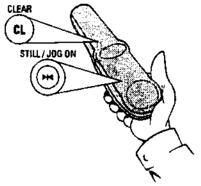
❶ Connect the desired sound source to the video recorder and insert a cassette ready for recording

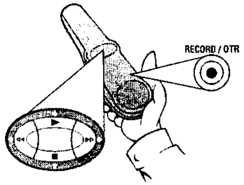
❷ Use ↓ or ↑ to select the corresponding programme number

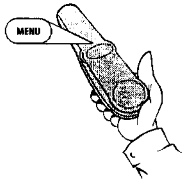




MAIN MENU
RECORDING FUNCTIONS
●→ RECORD SETTINGS →
↓ AUDIO ONLY
AUDIO DUBBING
VIDEO INSERT
SYNCHRO EDIT
CAMERA LINK
TO EXIT
PRESS MENU







❸ Press the **MENU** button. The on-screen menu appears

❹ Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →

❺ Use ↓ or ↑ to select the option "AUDIO DUBBING" and confirm with →

❻ The video recorder switches to still picture

❼ Wind to the space on the tape, where the dubbing should end, and with the button **CLEAR (CL)** set the counter to "00:00:00"

✗ **The tape stops automatically and the "RECORD FUNCTIONS" screen appears**

✔ The end of the tape was reached during winding or playback. Go back to step ❺, to start this procedure again.

PROBLEM

❽ Wind to the space on the tape, where the dubbing should begin, and press ▶◀. The video recorder switches to still picture

❾ Press ▶◀ (still picture) several times until the desired point is reached and confirm with the Stop button ■

❿ On the connected sound source start the playback of the sound signal and press **simultaneously** the Record button ● on the remote control of the video recorder to start the recording.

⓫ The new sound signal is being recorded. As soon as the tape position previously marked with "00:00:00" is reached, the dubbing will stop automatically

⓬ Finish with the **MENU** button

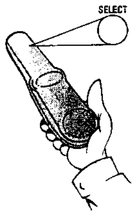
Make dubbing audible

To make dubbing audible, you must select the "MIX" or "MONO" sound channel setting (see "Selecting the sound channel").

TIP

Selecting the sound channel

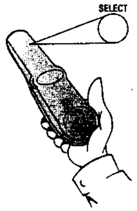
During playback or while receiving a TV channel via the video recorder, one or more sound channels can be selected. This means, for example, if there are multilingual transmissions, you can select the language you want.



❶ Press the **SELECT** button on the remote control. The current sound channel setting is displayed

What goes on behind the settings?

STEREO: Both left and right stereo sound tracks can be heard
LEFT: The left stereo sound track can be heard
RIGHT: The right stereo sound track can be heard
MONO: The mono sound track can be heard
MIXED: The mono sound track as well as the left and right stereo sound tracks can be heard



❷ Press the **SELECT** button several times until the desired setting can be seen on the screen

Automatic switch-over to mono

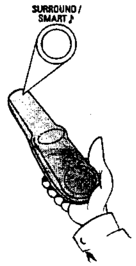
If no stereo signal is recorded on a video cassette, the video recorder automatically switches over to the "MONO" sound channel setting

Make dubbing audible

When dubbing video recordings, the mono track is recorded with a new sound signal. The original stereo signal is retained. To make dubbing audible, you must select the "MIX" or "MONO" sound channel setting.

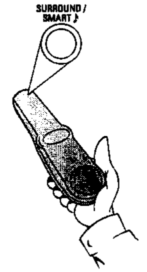
Selecting sound setting (Smart Sound)

Using the button **SURROUND/SMART** ♪ the picture settings can be displayed and altered. There are four different settings available.


SURROUND / SMART ♪

❶ Press once on the **SURROUND/SMART** ♪ button. The current sound setting will be displayed

❷ Press several times on the **SURROUND/SMART** ♪ button to change the sound setting. Each time the button is pressed, the next sound setting will be displayed.

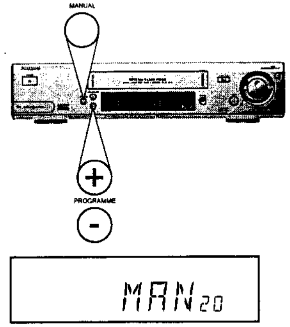

SURROUND / SMART ♪

What types of sound settings are available to me?

"STANDARD":	Neutral sound impression
"SURROUND":	Wider sound impression
"MUSIC":	Optimal setting for music playback
"SPEECH":	Optimal setting for speech playback

❸ As soon as the **SURROUND/SMART** ♪ button is released for a few seconds, the last selected picture setting will be accepted.

Manual mute



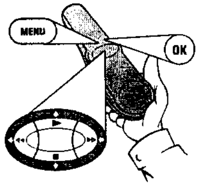
With the **MANUAL** button on the front of the video recorder you can regulate the signal level of the audio signals (scart sockets, audio sockets) received by the video recorder.

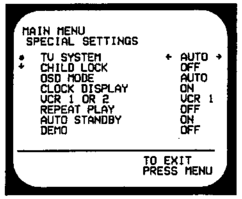
❶ Press the **MANUAL** button on the front of the video recorder until the current setting (e.g. "MAN20") appears in the display

❷ On the front of the video recorder use **PROGRAMME -** or **PROGRAMME +** to select the desired setting or press **MANUAL** again, to switch back to automatic mute ("AUTO")

Energy-saving mode

To reduce the power consumption of the video recorder you can switch the clock in the display of the video recorder on or off.





```
MAIN MENU
 SPECIAL SETTINGS
●   TV SYSTEM            ← AUTO →
↓   CHILD LOCK             OFF
    OSD MODE               AUTO
    CLOCK DISPLAY          ON
    VCR 1 OR 2             VCR 1
    REPEAT PLAY            OFF
    AUTO STANDBY           ON
    DEMO                   OFF

                   TO EXIT
                   PRESS MENU
```

❶ Press the **MENU** button on the remote control. The on-screen menu appears

❷ Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →

❸ Use ↓ or ↑ to select the option "CLOCK DISPLAY", use → or ← "ON" (time display on in standby mode) or "OFF" (time display off in standby mode) and confirm with **OK**. The screen will show "STORED"

❹ Finish with the **MENU** button

Preparing synchronised re-recording (Synchro Edit)

The "Synchro Edit" function allows you to re-record picture and sound signals from special Camcorders directly onto VHS cassettes.

How does "Synchro Edit" function?

With the help of a synchronizing impulse and a (variable) switch-on time (Preroll time) the beginning of playback and recording can be so precisely tuned that not a single second of the audio/video signal required for the re-recording is lost. Warning: To make proper use of this function, the linked Camcorder must have a compatible "Synchro Edit"!

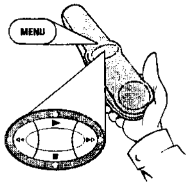
1. Plug the Camcorder into the front socket on the video recorder

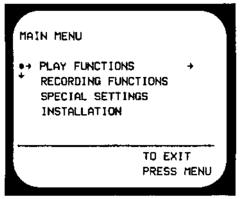
Which connections are necessary?

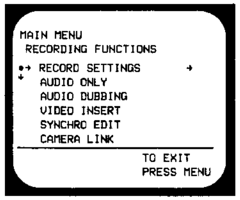
VR 910	*Cable*	*Camcorder*
Socket EDIT	Synchro Edit Cable	corresponding socket**
Socket L AUDIO R	Coaxial cable*	corresponding socket**
Socket VIDEO	Coaxial cable	corresponding socket**

*...attached to the video recorder

**...If necessary, you should refer to the instructions for your Camcorder for assistance.




MAIN MENU
→ PLAY FUNCTIONS →
RECORDING FUNCTIONS
SPECIAL SETTINGS
INSTALLATION
TO EXIT
PRESS MENU


MAIN MENU
RECORDING FUNCTIONS
→ RECORD SETTINGS →
AUDIO ONLY
AUDIO DUBBING
VIDEO INSERT
SYNCHRO EDIT
CAMERA LINK
TO EXIT
PRESS MENU

2. Press the **MENU** button on the remote control. The on-screen menu appears

3. Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →

4. Use ↓ or ↑ to select the option "CAMERA LINK". Switch the Camcorder to still picture and confirm with → on the remote control of the video recorder

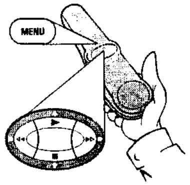
5. The video recorder checks the connected Camcorder type. The screen will show "LINK DETECTED - CAMERA TO CONTROL VIDEO RECORDER" or "LINK DETECTED - VIDEO RECORDER TO CONTROL CAMERA"

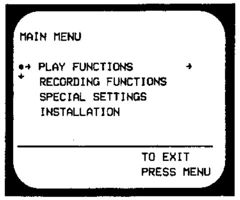
What goes on behind this message?

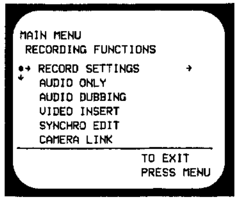
VIDEO RECORDER TO CONTROL CAMERA:
The video recorder controls the synchronized re-recording. Start and end is controlled by pressing the video recorder buttons.

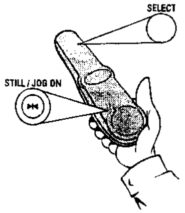
CAMERA TO CONTROL VIDEO RECORDER:
The Camcorder controls the synchronized re-recording. Start and end is controlled by pressing the Camcorder buttons.

Making a synchronised re-recording (Synchro Edit)




MAIN MENU
→ PLAY FUNCTIONS →
RECORDING FUNCTIONS
SPECIAL SETTINGS
INSTALLATION
TO EXIT
PRESS MENU


MAIN MENU
RECORDING FUNCTIONS
→ RECORD SETTINGS →
AUDIO ONLY
AUDIO DUBBING
VIDEO INSERT
SYNCHRO EDIT
CAMERA LINK
TO EXIT
PRESS MENU


SELECT
STILL/JOG ON

1. Press the **MENU** button on the remote control. The on-screen menu appears

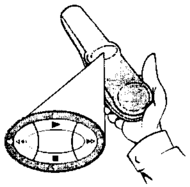
2. Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →

3. Use ↓ or ↑ to select the option "SYNCHRO EDIT" and confirm with →

4. A still picture of the precise point on the tape in the video recorder will appear. If necessary find the point on the tape at which the synchronized re-recording is to begin and switch again to still picture with the **STILL / JOG ON ▶|◀** button

5. Press **SELECT**. The current picture from the linked Camcorder appears

6. Find the point on the tape where the synchronized re-recording is to begin and switch again to still picture



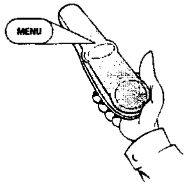
❼ Start or interrupt the synchronised re-recording in the following manner:

VIDEO RECORDER TO CONTROL CAMERA:

Start:	RECORD/OTR ● button
Interrupt:	■ button

CAMERA TO CONTROL VIDEO RECORDER:

Start:	Corresponding (Play) button on the Camcorder
Interrupt:	Corresponding (Pause) button on the Camcorder



❽ Press the **MENU** button on the remote control of the video recorder, to leave the Synchro Edit mode

✗ **The first few seconds of a synchronized re-recording are not recorded**

✗ **Before a synchronized re-recording a still picture appears for a few seconds**

✔ The Preroll time is not correctly adjusted. Read the section "Adjusting Preroll time".

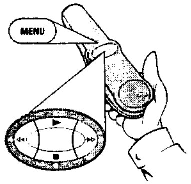
PROBLEM

Adjusting Preroll time

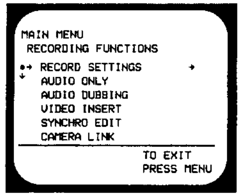
What is Preroll time?

For a synchronized re-recording the playback and recording appliances must be started at the same time. However, different appliances react at different speeds. In such cases the Preroll function will allow a fixed space of time to be inserted, to ensure that one appliance starts earlier or later than the other. This avoids recordings starting too soon or too late.

PARDON?



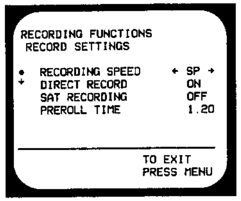
❶ Press the **MENU** button on the remote control. The on-screen menu appears



```
MAIN MENU
 RECORDING FUNCTIONS
•→ RECORD SETTINGS          →
↓  AUDIO ONLY
   AUDIO DUBBING
   VIDEO INSERT
   SYNCHRO EDIT
   CAMERA LINK
               TO EXIT
               PRESS MENU
```

❷ Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →

❸ Use ↓ or ↑ to select the option "RECORD SETTINGS" and confirm with →



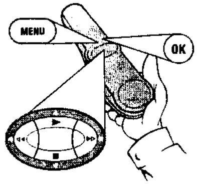
```
RECORDING FUNCTIONS
 RECORD SETTINGS

•  RECORDING SPEED     ← SP →
↓  DIRECT RECORD         ON
   SAT RECORDING         OFF
   PREROLL TIME          1.20

               TO EXIT
               PRESS MENU
```

❹ Use ↓ or ↑ to select the option "PREROLL TIME" and change the settings with ← and → or with **0-9**

How do I discover the correct preroll time?

Since you can make a synchronized re-recording with any "Synchro Edit" compatible appliance, there is no fixed preroll time that will operate for every combination of appliances. Experiment to find the correct setting. Preroll times can be adjusted between 1 and 5 seconds.

PARDON?



❺ Confirm the amended Preroll time with **OK**

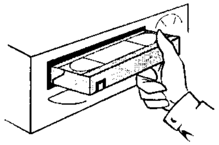
❻ Complete the adjustment of the Preroll time with the **MENU** button

Inserting recordings (Video Insert)

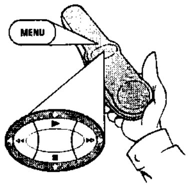
What do I need this function for?

With "Video Insert" you can insert a new recording directly into an existing recording. The signal source for this may be an existing Camcorder or a second video recorder (connect to the audio/video socket on the front of the video recorder or the Scart socket at the back of the video recorder).

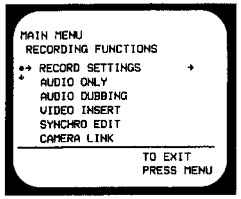
PARDON?



❶ Insert a cassette for each recording, into which a new recording is to be inserted



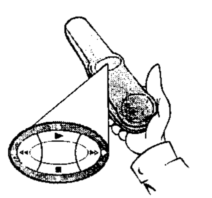
❷ Press the **MENU** button on the remote control. The on-screen menu appears



```
MAIN MENU
 RECORDING FUNCTIONS
•→ RECORD SETTINGS          →
↓  AUDIO ONLY
   AUDIO DUBBING
   VIDEO INSERT
   SYNCHRO EDIT
   CAMERA LINK
               TO EXIT
               PRESS MENU
```

❸ Use ↓ or ↑ to select the option "RECORDING FUNCTIONS" and confirm with →

❹ Use ↓ or ↑ to select the option "VIDEO INSERT" and confirm with →



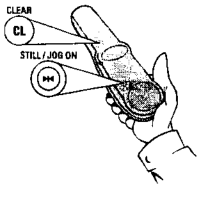
⑤ Use ↓ or ↑ to select the programme number, that is to be inserted for the new programme

Which programme numbers are available for selection?

Theoretically all, that have been allocated a TV channel by your video recorder are available. Most recordings are derived from external signal sources (Camcorder, video recorder etc....) To connect these there are three options:

E1	Scart socket AV1 EXT1 (Rear)
E2	Scart socket AV2 EXT2 (Rear)
E3	Audio/Video socket (Front)

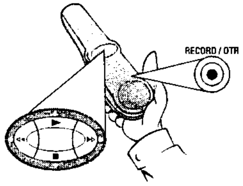
PARDON?



⑥ Find the point <u>on the inserted cassette</u>, where the synchronized re-recording is to end, and press **STILL/JOG ON ▶I◀**

⑦ Press **CLEAR (CL)**. The tape position will be reset to "00 : 00 : 00"

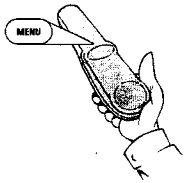
⑧ Find the point <u>on the inserted cassette</u>, where the synchronized re-recording is to begin, and press **STILL/JOG ON ▶I◀**



⑨ Press the Stop button ■. The video recorder switches to Pause

⑩ Start playback <u>on the connected playback set</u>

⑪ As soon as the point on the tape is reached where the recording is to be inserted press the **RECORD/OTR ●** button on the video recorder



⑫ The video recorder starts recording and stops **automatically** at the tape position previously marked with "00 : 00 : 00"

⑬ Finish the "Video Insert" function with the **MENU** button

---

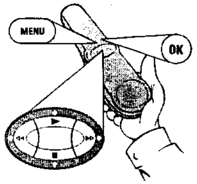
Adapting remote control

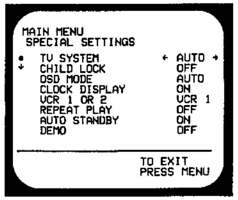
If you are using two video recorders which both react to the same remote control commands, you can use this function to change remote control and video recorder to other commands.

What are remote control codes?

Each time the button on your remote control is pressed, an invisible infra-red signal is sent to the video recorder. Each button has been allocated a specific code, which ensures, that the video recorder will carry out the corresponding function. If two video recorders respond to the same codes, the remote control signal emitted will be recognised and performed by both. Therefore the possibility exists, to allocate different remote control commands (with other codes) to this video recorder. This means that the uninterrupted use of both video recorders is possible once more.

PARDON?





```
MAIN MENU
 SPECIAL SETTINGS
●  TV SYSTEM            ← AUTO →
↓  CHILD LOCK             OFF
   OSD MODE               AUTO
   CLOCK DISPLAY          ON
   VCR 1 OR 2             VCR 1
   REPEAT PLAY            OFF
   AUTO STANDBY           ON
   DEMO                   OFF
─────────────────────────────────
                     TO EXIT
                     PRESS MENU
```

① During playback press the **MENU** button on the remote control. The on-screen menu appears

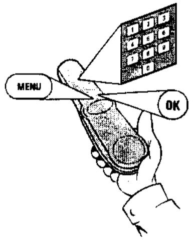
② Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →

③ Use ↓ or ↑ to select the option "VCR 1 OR 2", use → or ← to select "VCR 1" or "VCR 2" and confirm with **OK**. The video recorder has now been reset to the desired mode

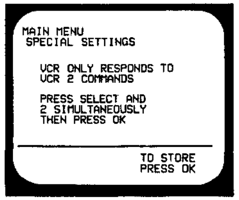
What must I set?

If two video recorders respond to the same codes, they are either both set to "VCR 1" or "VCR 2". Please change the setting of only one video recorder! The factory setting of the video recorder is "VCR 1".

TIP



④ Now press, on the remote control, **simultaneously** on the buttons **SELECT** and the number button corresponding to the previously selected setting (thus "1" for "VCR 1" or "2" for "VCR 2")



```
MAIN MENU
 SPECIAL SETTINGS

   VCR ONLY RESPONDS TO
   VCR 2 COMMANDS

   PRESS SELECT AND
   2 SIMULTANEOUSLY
   THEN PRESS OK
─────────────────────────────────
                     TO STORE
                     PRESS OK
```

⑤ Confirm with **OK**. The remote control has now been reset to the new commands

⑥ Finish with the **MENU** button

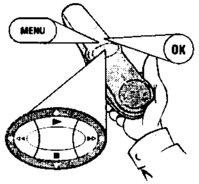
✗ **After the buttons are pressed "VCR 1" or "VCR 2" appears in the display of the video recorder**

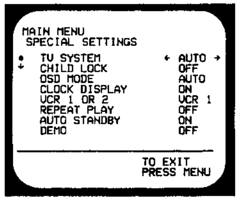
✓ *Repeat step* ② *to reset the remote control to the* displayed settings

PROBLEM

Demonstration mode

In this operating mode, the video recorder automatically gives a demonstration of its functions after switching off. Programmed recordings are obviously performed.





```
MAIN MENU
 SPECIAL SETTINGS
●   TV SYSTEM            ← AUTO →
↓   CHILD LOCK             OFF
    OSD MODE               AUTO
    CLOCK DISPLAY          ON
    VCR 1 OR 2             VCR 1
    REPEAT PLAY            OFF
    AUTO STANDBY           ON
    DEMO                   OFF
_________________________________
                 TO EXIT
                 PRESS MENU
```

❶ Press **MENU**. The on-screen menu appears

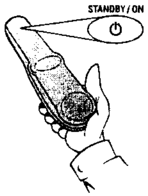
❷ Use ↓ or ↑ to select the option "SPECIAL SETTINGS" and confirm with →

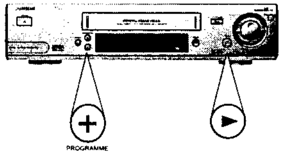
❸ Use ↓ or ↑ to select the option "DEMO", use → or ← to select "ON" or "OFF" and confirm with **OK**

❹ Finish with the **MENU** button

Adjusting the key illumination

The front of the video recorder is fitted with illuminated keys that react to pressure. This function can be activated or deactivated as follows:





❶ Make sure there is no cassette in the video recorder

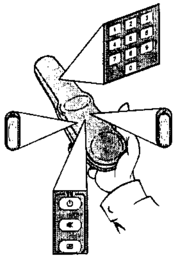
❷ Switch off the video recorder with the Standby button ⏻

❸ Press simultaneously on the front of the video recorder the buttons **PLAY ▶** and **PROGRAMME +** until the display shows "OFF" (key illumination deactivated) or "ON" (key illumination activated)

❹ The adjustment of the key illumination is complete

Using the TV remote control

With the enclosed multicode remote control you can control the main functions of your TV set. To do this, you must first enter the make of your TV set.



❶ Find the make of your TV set from the list below and take note of the corresponding remote control code(s)

❷ Hold down the button ⊿ - and enter one of the listed codes with the number buttons **0-9**.

❸ Now you can control your TV set remotely with the following buttons:

+ ⊿ -	(Increase / decrease TV volume)
TV / ⏻	Switch TV on / off
TV / 🔇	Switch TV volume on / off
TV / AV	(Switch TV to programme number AV)
+ TV -	(Next / previous TV programme number)

REMOTE CONTROL CODES

Brandt	21	Philips	01
Emerson	14	RCA	10
Ferguson	31	Saba	21
Finlux	33	Salora	30
Funai	35	Samsung	01, 18, 37, 38, 39
GoldStar	04	Sanyo	11
Graetz	30	Seleco	30
Grundig	24, 25	Sharp	16
Hitachi	12	Sony	09
ITT	30	Telefunken	21
JVC	05, 27, 28, 29	Thomson	21, 22, 23
Luxor	30	Toshiba	08
Magnavox	01, 02, 03	Zenit	06, 15
Mitsubishi	13, 26		
Mivar	32		
NEC	36		
Nokia	34		
Nordmende	21		
Panasonic	07, 17, 19, 20		

If the codes corresponding to your set do not succeed, please try entering one of the other remote control codes listed.

12 Suppressing interference

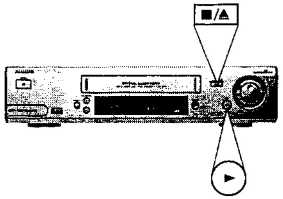
Optimizing the modulator

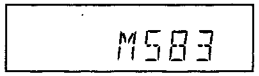
If the TV set and the video recorder are only connected with an aerial cable - rather than with an additional scart cable - it may happen that in certain reception locations the modulator frequency of the video recorder is occupied by a TV channel. As soon as the video recorder is switched on, the reception quality of the TV picture deteriorates. The following steps will show you how to overcome this problem.

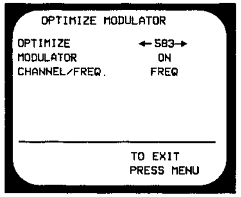
What is a modulator?

The purpose of this electronic assembly inside your video recorder is to pass on the picture and sound information read in from the video tape via an aerial cable like a TV signal to the TV set. The modulator frequency determines the frequency range in which these signals are transmitted.

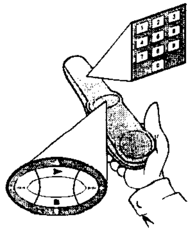
TIP







```
OPTIMIZE MODULATOR
OPTIMIZE          ←583→
MODULATOR           ON
CHANNEL/FREQ.      FREQ

              TO EXIT
              PRESS MENU
```



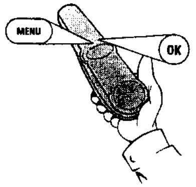
1. Switch the video recorder on and make sure there is no cassette in the video recorder
2. Press simultaneously on the front of the video recorder the button **STOP/EJECT ■/▲** and the button **PLAY ►** until the display shows the modulator frequency (e.g. "M583" or "CH36")
3. The video recorder will now transmit a test image on this frequency
4. Use ↓ or ↑ to select the option "OPTIMIZE" and enter a new frequency with the number buttons **0-9**

Which modulator frequency should I enter?

You can also make the video recorder search automatically for an appropriate frequency. To do so, simply hold down the button →. As soon as a free frequency has been found, it will be shown in the display.

PROBLEM

5. Tune the programme number of your TV set allocated for video use to the new modulator frequency until you see the test image sharply and in colour



6. Confirm the new modulator frequency with **OK**. The screen will show "STORED"
7. Leave the on-screen menu with the **MENU** button

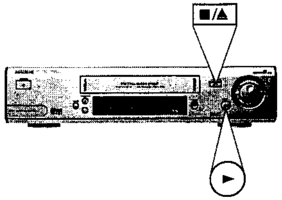
Switching off the modulator

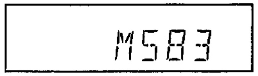
If you have connected the video recorder to the TV set with a scart cable, you can switch off the modulator when there is interference with the picture or sound (see below).

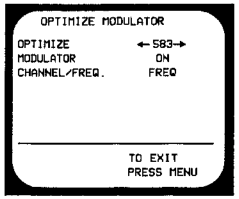
FOR EXPERTS

Switching the modulator on / off

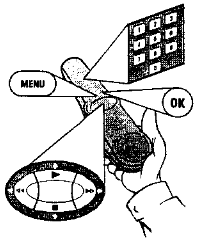
If picture and sound interference cannot be removed by optimising the modulator, the integral modulator can be switched off. Warning: this is only possible if you have connected the video recorder to the TV set with a scart cable. It is not possible to operate with the modulator switched off without a scart cable.







```
OPTIMIZE MODULATOR
OPTIMIZE          ←583→
MODULATOR           ON
CHANNEL/FREQ.      FREQ

              TO EXIT
              PRESS MENU
```



1. Switch the video recorder on and make sure there is no cassette in the video recorder
2. Press simultaneously on the front of the video recorder the button **STOP/EJECT ■/▲** and the button **PROGRAMME-** until the display shows the modulator frequency (e.g. "M583" for 583 MHz)
3. The video recorder will now transmit a test image on this frequency
4. Use ↓ or ↑ to select the option "MODULATOR"
5. Use → or ← to select the setting "ON" (Modulator on) or "OFF" (Modulator off)
6. Confirm with **OK**. In the display there will briefly appear "OK". The screen will show "STORED"
7. Leave the on-screen menu with the **MENU** button

ADJUSTMENT INSTRUCTIONS

1.Tape Manager

Set the tape manager number

This setting has to be done after replacement of the EEPROM.

- call up the service test program, select step 43
- the display shows T-:--:43
- using the remote control, type in the last tree digits of the serial number, located on the type plate of the set
- press the ok button
- exit the service test program.

2. Video signal processing (VS-SEC)

Service tasks after replacement of ICs 7004, 7072:

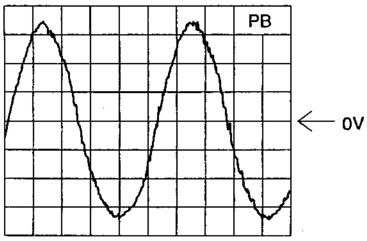
Before commencing adjustment:
Call the service test program and enter Step 10 (Dummy mode). Remove the drive from the motherboard.

2.1 3.3 MHz adjustment [3089] (for SECAM)

Purpose: To adjust the mixing oscillator

Consequences of incorrect settings:
Cross patterns in coloured areas, coloured noise.

TP	ADJ.	MODE	INPUT
IC7072 pin 17	R3089	Dummy mode step 10 playback	1.2 MHz sinus 100mVpp, R3065 +5V on IC 7072 pin16; R3064
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope Video pattern generator Sinus generator	adjust to optimum sinus



A: AC, 50mV/Div, 50ns/Div
IC 7072 Pin 17

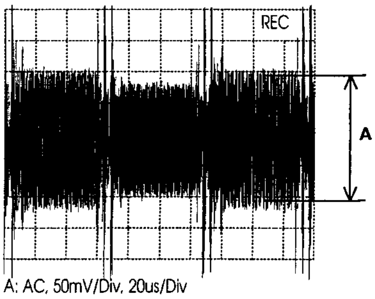
2.2 SECAM chrominance record current adjustment [3088]:

Purpose: To set the optimum record SECAM chroma level.

Symptom, if incorrectly set:
If the record level is too high, beats may appear on the picture. If the level is too low, the colour may be degraded.

TP	ADJ.	MODE	INPUT
CSRV pos.9068	R3088	Dummy mode Record Preset E2	(VIDEO IN E2) Red Picture SECAM 75% Satuation
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope Video Pattern Generator	A=240 ± 15 mV_{pp}.

Notes: With varying frame amplitudes, the setting is made for the greatest amplitude.

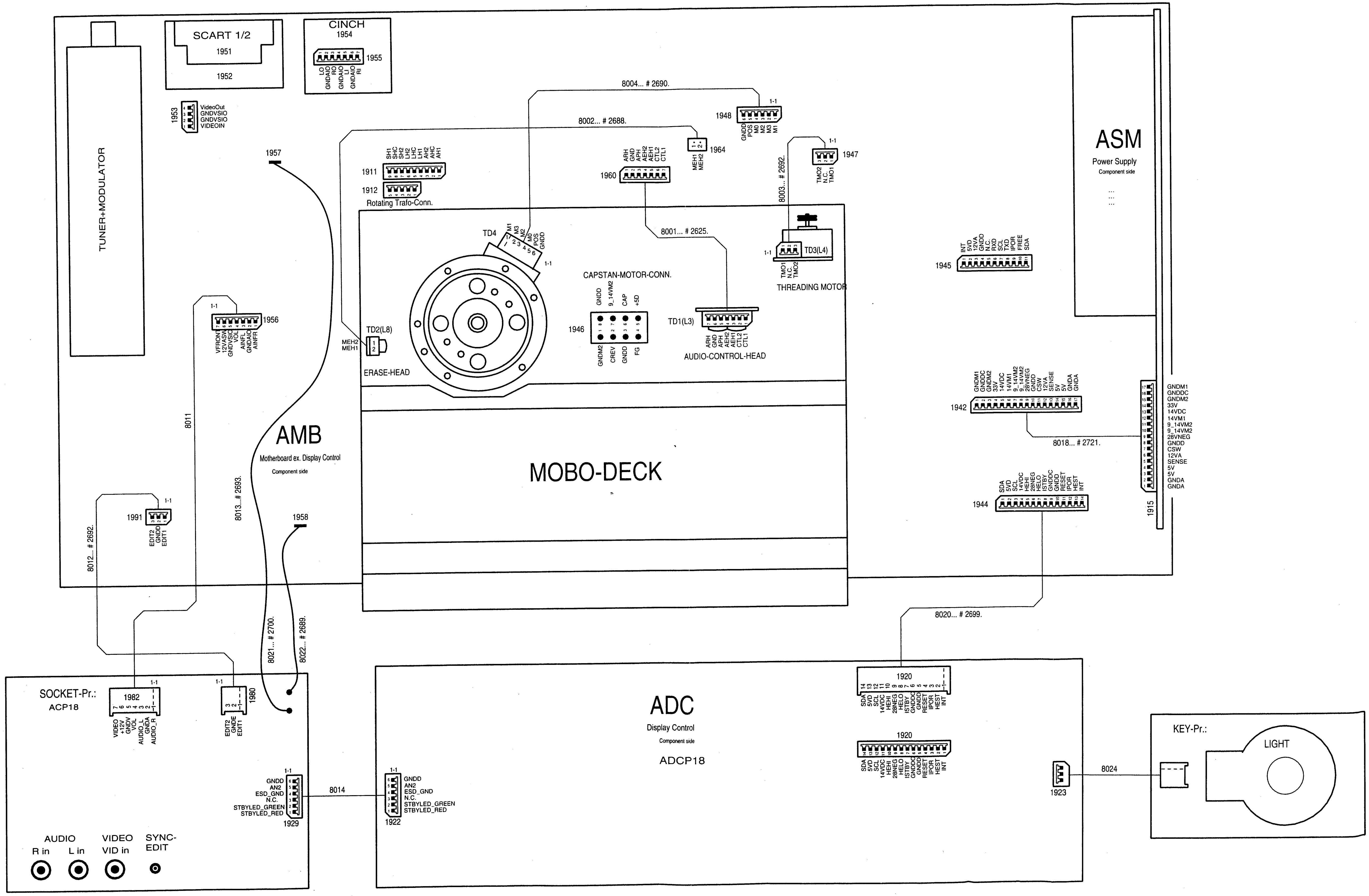


A: AC, 50mV/Div, 20us/Div

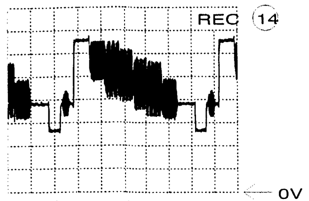
List of Signal Abbreviations

2FSC	2x Colour subcarrier
10SC12	Scart 1/2 Pin 10
8SC1	Scart 1 pin 8 input
8SC1H	Scart 1 pin 8 high level
8SC1M	Scart 1 pin 8 medium level
8SC2	Scart 2 pin 8 input
9_14VM2	Capstan motor supply, switched
A0-19	Adress lines
AEH1/2	Audio erase head
AF1	Audio from frontend, left
AF2	Audio from frontend, right
AFC	Automatic frequency control
AFE	Audio from frontend
AGC	Automatic gain control
AH1/2/C	Audio heads
AIN1L	Audio input scart 1, left
AIN1R	Audio input scart 1, right
AIN2L	Audio input scart 2, left
AIN2R	Audio input scart 2, right
AINBL	Audio left from cinch connector
AINBR	Audio right from cinch connector
AINFL	Audio left from Front connector
AINFR	Audio right from front connector
AMCO	Audio mono to the modulator
AMLP	Audio mono playback
AMLR	Audio mono record
AN1/2	Analog voltage from keyboard matrix
ANIL	NICAM Audio, left
ANIR	NICAM Audio, right
AOUT1L	Audio output from scart 1, left
AOUT1R	Audio output from scart 1, right
AOUT2L	Audio output from scart 2, left
AOUT2R	Audio output from scart 2, right
APH	Audio playback head
ARH	Audio record head
CAGC	Chroma Automatic gain control
CAP	Capstan regulation voltage
CKDET	Colour killer detection
CNR	Chroma Noise Reduction
CPRV	Chrominance PAL record
CREV	Capstan reverse
CROT	Colour rotation
CS0	Chip Select 0
CS1	Chip Select 1
CSCP	Colour phase switching for LP feature mode
CSI	Colour system information
CSP	Chrominance secam playback
CSPO	Chroma to Noise Reduction
CSRV	Chrominance secam record
CSW	9V/17V switching for capstan motor
CSYNC/1/2	Composite sync pulse
CTL1/2	Control track signal
D0-7	Data lines
DC_RESET	Reset Display Control
DRUM	Head wheel control
EDIT1/2	Synchro-Edit control signal
ENVC	Envelope comparator signal
FFP	Feature frame pulse
FGD	Capstan tacho pulse digital
FM1	L+R
FM2	2R
FMAP	FM audio playback
FMAR	FM audio record
FMPV	FM video playback
FMRV	FM video record
FOME	Follow Me (video signals equal)
FSC	Colour subcarrier
FTA	Threading tacho
FTAD	Threading tacho digital
HEHI	Heater for displaytube high
HELO	Heater for displaytube low
HEST	Heater voltage control signal
HP1	Head pulse video
HP2	Head pulse audio
HSC	Head Select Control (SP/LP)
IMEO	Main erase oscillator on/off
INIT	Deck switch
INT	Interrupt
IPOR	Inverse power on reset
IRAF	Inverse record FM-audio
IRAL	Inverse Record Audio Linear
IREV	Inverse Record Video
ISTBY	Inverse stand by
ISWS	Crosstalk Reduction
IWIND	Control pulse amplification low
LH1/2/C	Long play heads
MEH1/2	Main erase head
MON	Loop through pin 16 scart 2/1
MTA	Audio mute
NC	Not connected
ODAT	Shift register bus data
OFP	OSD Frame pulse
PBV	Playback Video
PG_FG	Head wheel position/-speed
PIN10_IN	Pin 10 scart 1/2 output
PIN10_OUT	Pin 10 scart 1/2 input
POR	Power on reset
PSS	PAL/SECAM Switch
RD	Output Enable RAM/ROM
RECP	Record protection
RxD	Receive Data
SB1	Secam band 1
SCL	IIC bus clock
SDA	IIC bus data
SCL2	YCA IIC bus clock
SDA2	YCA IIC bus data
SCL3	High Speed IIC bus clock
SDA3	High Speed IIC bus data
SFS	Sound filter switch
SH1/2/C	Standard play heads
SRCLK	Shift Register Clock
SSIF	Second sound intermediate frequency
STROBE	Strobe pulse for shiftregister
SWIN	Head switching pulse
SYNC	Control track pulse
TAE	Tape end detection
TAS	Tape start detection
THIO	Threading motor in/out
TMO	Loading motor on/off
TRIA_ALM	Tracking information audio / Audio level indication
TRIV	Tracking information video
TxD	Transmit Data
VBS	Video to signal electronics
VCCD1	Signal before Y-CCD
VCCD2	Signal after Y-CCD
VFRONT	Video from front connector
VFV	Video from front end
VIDOUT1	Video output scart 1
VIDOUT2	Video output scart 2
VIDEOIN1	Video input scart 1
VIDEOIN2	Video input scart 2
VISS	Control sync pulse inversion
VOL	headphone volume
VOUT	Video from OSD part
VSB	Video from signal electronics
W_R	Control track write/read
WR	Write enable for RAM
WTL	Wind tacho left
WTLD	Wind tacho left digital
WTR	Wind tacho right
WTRD	Wind tacho right digital

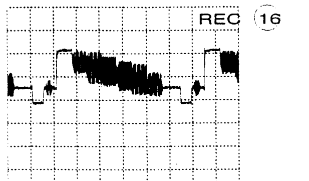
Wiring Diagram


TUNER+MODULATOR
SCART 1/2
1951
1952
CINCH
1954
1955
LO GNDAIO RO GNDAIO LI GNDAIO RI
1953
VideoOut
GNDVSIO
GNDVSIO
VIDEOIN
1957
1956
1-1
VFRONT 12VASW GNDVSIO VOL AINFL GNDAIO AINFR
8011
AMB
Motherboard ex. Display Control
Component side
8013... # 2693.
1991
1-1
EDIT2 GNDD EDIT1
8012... # 2692.
1958
8021... # 2700.
8022... # 2689.
8004... # 2690.
8002... # 2688.
1911
1912
SH1 SHC SH2 LH2 LHC LH1 AH2 AHC AH1
Rotating Trafo-Conn.
1960
ARH GND APH AEH2 AEH1 CTL2 CTL1
1964
MEH1 MEH2
1948
1-1
GNDD POS M0 M2 M3 M1
1947
1-1
TMO2 N.C. TMO1
8003... # 2692.
TD4
M1 M3 M2 M0 POS GNDD
1-1
8001... # 2625.
TD3(L4)
1-1
TMO1 N.C. TMO2
THREADING MOTOR
CAPSTAN-MOTOR-CONN.
1946
GNDD 9_14VM2 CAP +5D
GNDM2 CREV GNDD FG
TD1(L3)
ARH GND APH AEH2 AEH1 CTL2 CTL1
AUDIO-CONTROL-HEAD
TD2(L8)
MEH2 MEH1
ERASE-HEAD
MOBO-DECK
ASM
Power Supply
Component side
1945
INT 5VD 12VA GNDD N.C. RXD SCL TXD IPOR FREE SDA
1942
GNDM1 GNDDC GNDM2 33V 14VDC 14VM1 9_14VM2 9_14VM2 28VNEG GNDD CSW 12VA SENSE 5V 5V GNDA GNDA
1915
GNDM1 GNDDC GNDM2 33V 14VDC 14VM1 9_14VM2 9_14VM2 28VNEG GNDD CSW 12VA SENSE 5V 5V GNDA GNDA
8018... # 2721.
1944
SDA 5VD SCL 14VDC HEHI 28NEG HELO ISTBY GNDDC GNDD RESET IPOR HEST INT
8020... # 2699.
SOCKET-Pr.:
ACP18
1982
1-1
VIDEO +12V GNDV VOL AUDIO_L GNDA AUDIO_R
1980
1-1
EDIT2 GNDE EDIT1
1929
1-1
GNDD AN2 ESD_GND N.C. STBYLED_GREEN STBYLED_RED
8014
AUDIO R in L in
VIDEO VID in
SYNC-EDIT
ADC
Display Control
Component side
ADCP18
1922
1-1
GNDD AN2 ESD_GND N.C. STBYLED_GREEN STBYLED_RED
1920
SDA 5VD SCL 14VDC HEHI 28NEG HELO ISTBY GNDDC GNDD RESET IPOR HEST INT
1920
SDA 5VD SCL 14VDC HEHI 28NEG HELO ISTBY GNDDC GNDD RESET IPOR HEST INT
1923
8024
KEY-Pr.:
LIGHT

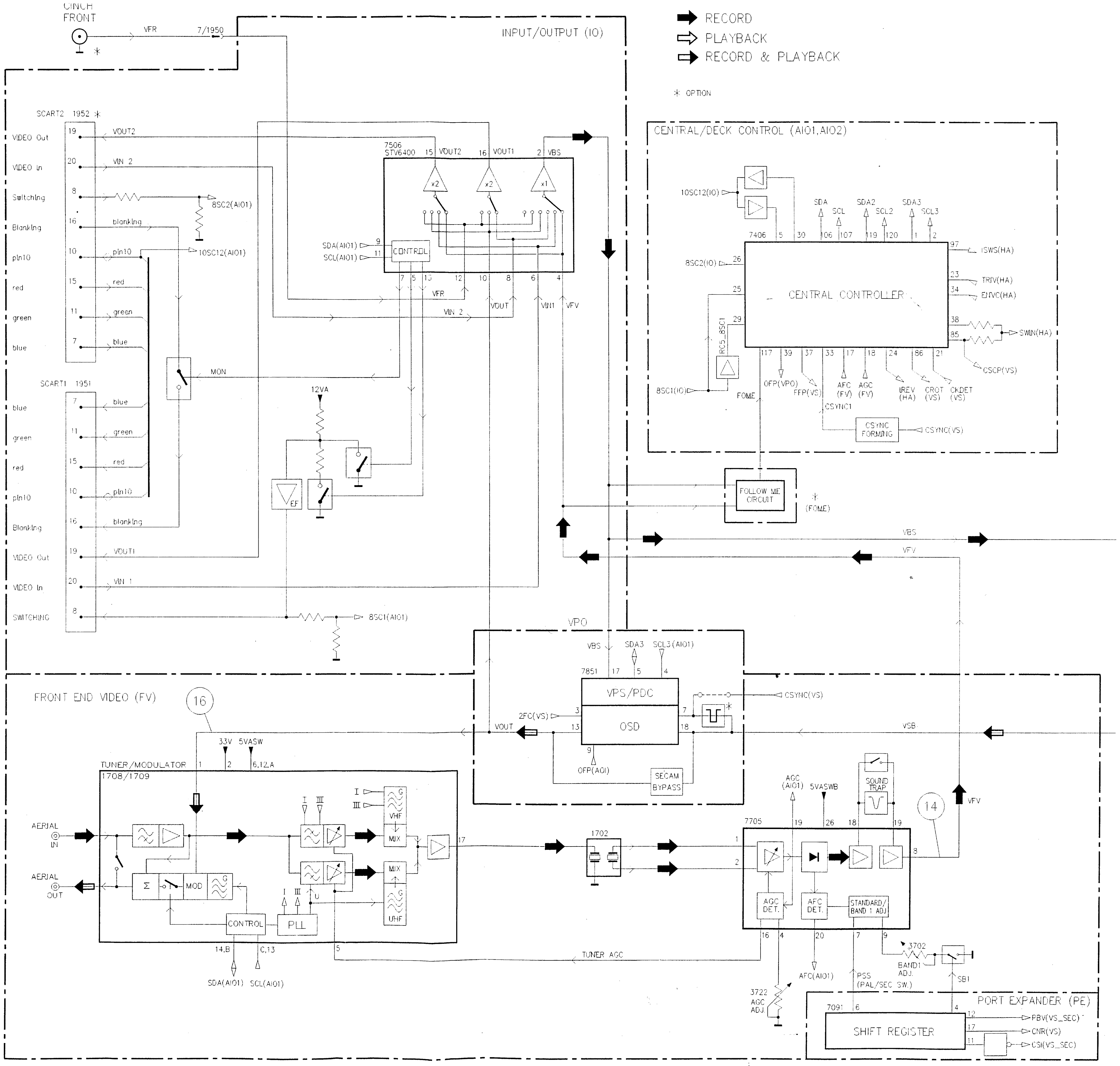
Block Diagram Video



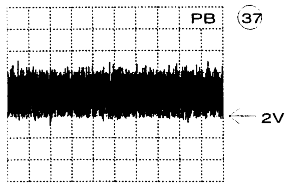
A: DC, 500mV/Div, 10us/Div
IC 7705 Pin 8



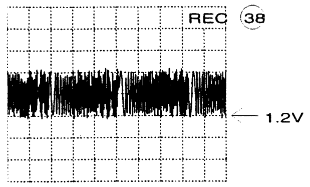
A: DC, 500mV/Div, 10us/Div
Tumod Pin 1


RECORD
PLAYBACK
RECORD & PLAYBACK
* OPTION
CINCH FRONT
VFR
7/1950
INPUT/OUTPUT (IO)
SCART2 1952 *
VIDEO Out
VIDEO In
Switching
Blanking
pin10
red
green
blue
VOUT2
VIN 2
8SC2(AI01)
blanking
10SC12(AI01)
SCART1 1951
VIDEO Out
VIDEO In
SWITCHING
VOUT1
VIN 1
8SC1(AI01)
MON
12VA
EF
7506
STV6400
15 VOUT2
16 VOUT1
2 VBS
x2
x2
x1
SDA(AI01)
SCL(AI01)
CONTROL
VFR
VOUT
VIN 2
VIN1
VFV
CENTRAL/DECK CONTROL (AI01,AI02)
10SC12(IO)
8SC2(IO)
8SC1(IO)
RC5_8SC1
7406
SDA
SCL
SDA2
SCL2
SDA3
SCL3
CENTRAL CONTROLLER
ISWS(HA)
TRIV(HA)
ENVC(HA)
SWIN(HA)
CSCP(VS)
OFP(VPO)
FFP(VS)
AFC (FV)
AGC (FV)
IREV (HA)
CROT (VS)
CKDET (VS)
FOME
CSYNC1
CSYNC FORMING
CSYNC(VS)
FOLLOW ME CIRCUIT
* (FOME)
VBS
VFV
VPO
VBS
SDA3
SCL3(AI01)
7851
VPS/PDC
OSD
2FC(VS)
VOUT
OFP(AOI)
SECAM BYPASS
CSYNC(VS)
VSB
FRONT END VIDEO (FV)
16
33V
5VASW
TUNER/MODULATOR
1708/1709
6,12,A
AERIAL IN
AERIAL OUT
Σ
MOD
G
VHF
MIX
MIX
UHF
I
III
U
CONTROL
PLL
14,B
C,13
SDA(AI01)
SCL(AI01)
TUNER AGC
1702
7705
AGC (AI01)
5VASWB
SOUND TRAP
14
VFV
AGC DET.
AFC DET.
STANDARD/ BAND 1 ADJ
3722 AGC ADJ.
AFC(AI01)
PSS (PAL/SEC SW.)
3702
BAND1 ADJ.
SB1
PORT EXPANDER (PE)
7091
SHIFT REGISTER
PBV(VS_SEC)
CNR(VS)
CSI(VS_SEC)

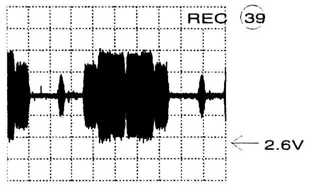
Block Diagram Video



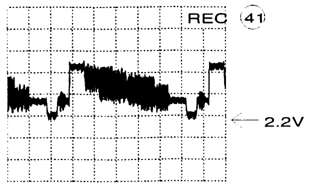
A: AC, 200mV/Div, 20us/Di
IC 7103 Pin 15



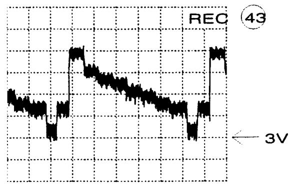
A: AC, 200mV/Div, 20us/Di
FMRV



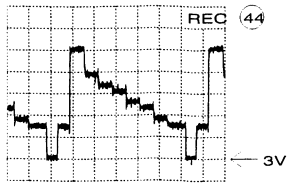
A: AC, 100mV/Div, 10us/Di
CPRV



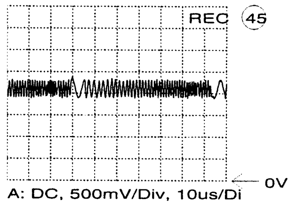
A: AC, 500mV/Div, 10us/Di
IC 7005 Pin 35



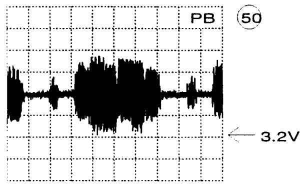
A: AC, 100mV/Div, 10us/Di
IC 7005 Pin 40



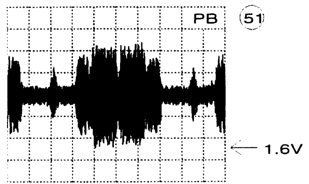
A: AC, 100mV/Div, 10us/Di
IC 7005 Pin 26



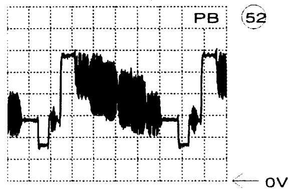
A: DC, 500mV/Div, 10us/Di
IC 7005 Pin 18



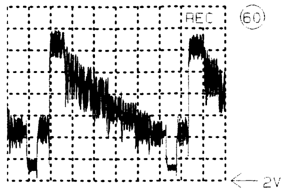
A: AC, 100mV/Div, 10us/Di
IC 7005 Pin 52



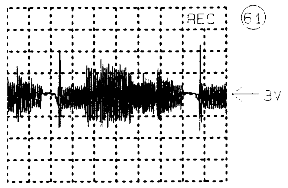
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 45



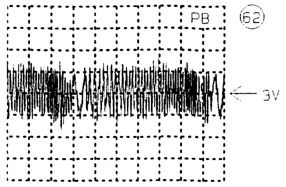
A: DC, 500mV/Div, 10us/Di
IC 7005 Pin 35



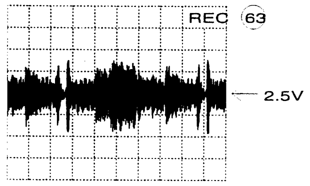
A: AC, 200mV/Div, 10us/Div
IC7072 Pin 15



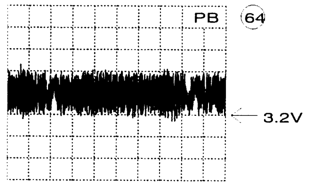
A: AC, 200mV/Div, 10us/Div
IC 7072 Pin 11



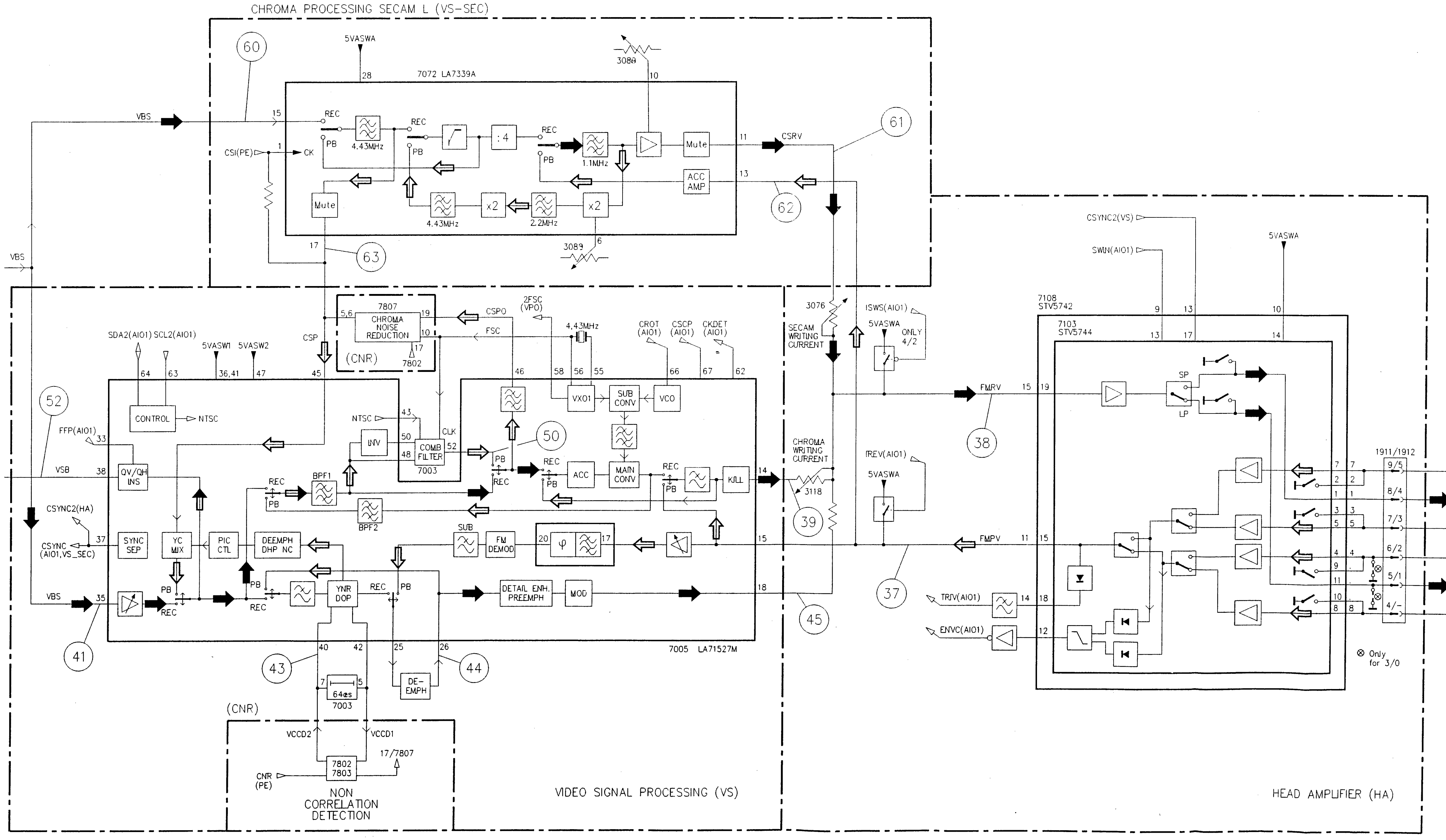
A: AC, 50mV/Div, 10us/Div
IC 7072 Pin 13



A: AC, 200mV/Div, 10us/Di
IC 7066 Pin 17

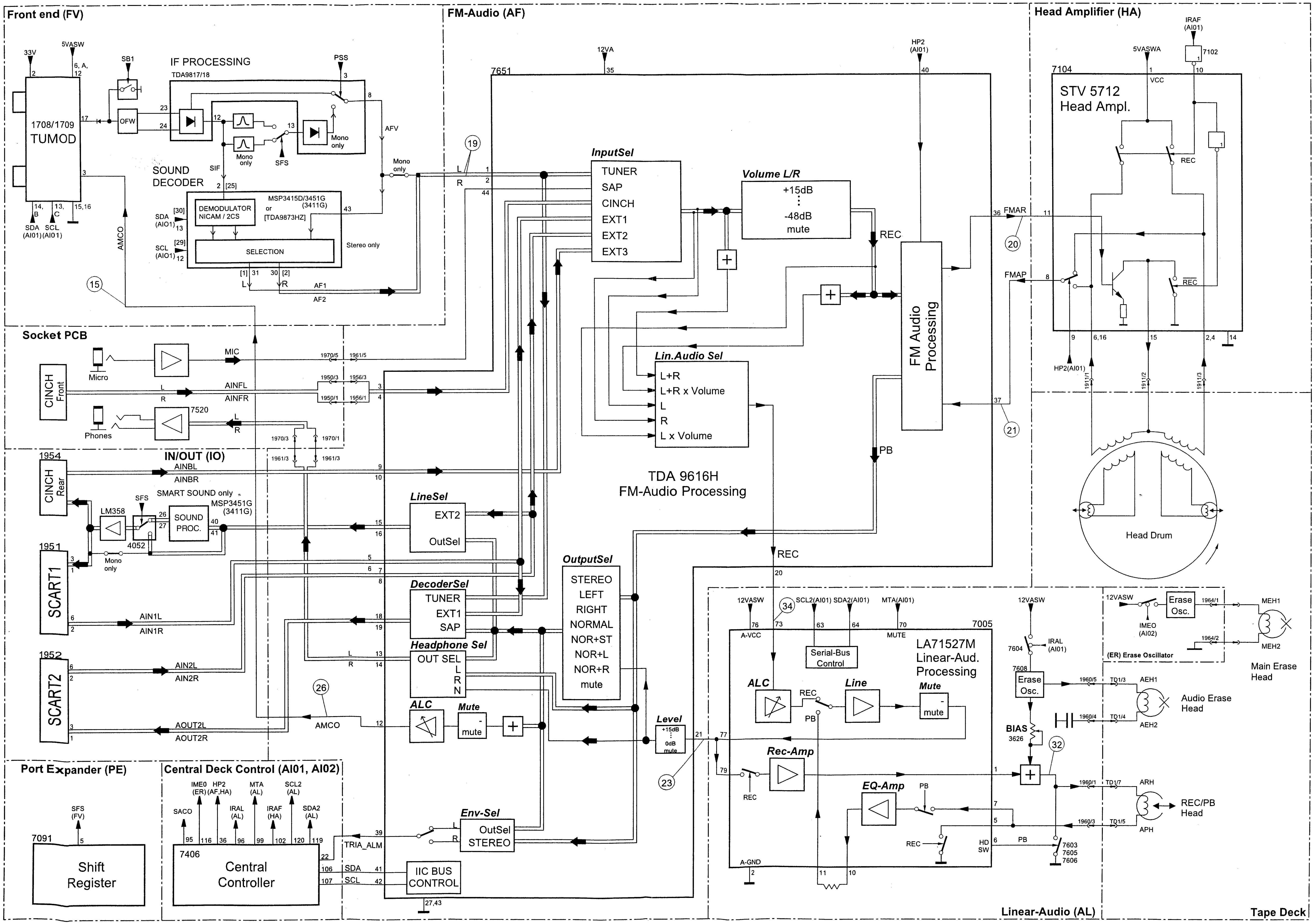


A: AC, 200mV/Div, 10us/Di
IC 7066 Pin 23

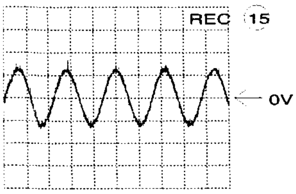

CHROMA PROCESSING SECAM L (VS-SEC)
5VASWA
3088
7072 LA7339A
28
10
(60)
VBS
15
REC
PB
4.43MHz
REC
PB
:4
REC
PB
1.1MHz
Mute
11
CSRV
(61)
CSI(PE)
1
CK
ACC AMP
13
(62)
Mute
4.43MHz
x2
2.2MHz
x2
17
(63)
3089
6
VBS
7807
CHROMA NOISE REDUCTION
5,6
19
10
17
7802
(CNR)
CSPO
2FSC (VPO)
FSC
4,43MHz
CROT (AI01)
CSCP (AI01)
CKDET (AI01)
SDA2(AI01) SCL2(AI01)
5VASW1 5VASW2
CSP
64
63
36,41
47
45
46
58
56
55
66
67
62
CONTROL
NTSC
VXO1
SUB CONV
VCO
(52)
FFP(AI01)
33
NTSC
43
INV
50
48
COMB FILTER
52
CLK
7003
(50)
VSB
38
QV/QH INS
REC
PB
BPF1
REC
PB
REC
ACC
MAIN CONV
REC
PB
KILL
14
BPF2
CSYNC2(HA)
CSYNC (AI01,VS_SEC)
37
SYNC SEP
YC MIX
PIC CTL
DEEMPH DHP NC
SUB
FM DEMOD
20
φ
17
15
VBS
35
PB
REC
PB
REC
YNR DOP
REC
PB
DETAIL ENH. PREEMPH
MOD
18
(41)
40
42
25
26
7005 LA71527M
(43)
(44)
7
5
64μs
7003
DE-EMPH
(CNR)
VCCD2
VCCD1
17/7807
CNR (PE)
7802
7803
NON CORRELATION DETECTION
VIDEO SIGNAL PROCESSING (VS)
3076
SECAM WRITING CURRENT
ISWS(AI01)
5VASWA
ONLY 4/2
CHROMA WRITING CURRENT
3118
(39)
IREV(AI01)
5VASWA
(45)
(37)
FMRV
15
19
(38)
FMPV
11
15
CSYNC2(VS)
SWIN(AI01)
5VASWA
7108 STV5742
9
13
10
7103 STV5744
13
17
14
SP
LP
TRIV(AI01)
14
18
ENVC(AI01)
12
7
2
1
3
5
4
9
11
10
8
1911/1912
9/5
8/4
7/3
6/2
5/1
4/-
⊗ Only for 3/0
HEAD DRUM
II
I
HEAD AMPLIFIER (HA)

A20_BV.dw
HG_0398

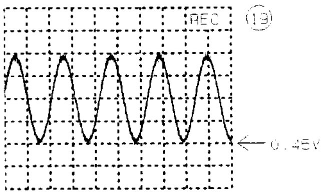
Block Diagram Audio


Front end (FV)
33V
5VASW
6, A, 12
1708/1709
TUMOD
SB1
OFW
IF PROCESSING
TDA9817/18
PSS
Mono only
SFS
SOUND DECODER
SIF
MSP3415D/3451G (3411G) or [TDA9873HZ]
DEMODULATOR NICAM / 2CS
SELECTION
Stereo only
AFV
AF1
AF2
SDA (AI01)
SCL (AI01)
AMCO
15
FM-Audio (AF)
12VA
HP2 (AI01)
7651
19
InputSel
TUNER
SAP
CINCH
EXT1
EXT2
EXT3
Volume L/R
+15dB
-48dB
mute
REC
FM Audio Processing
Lin.Audio Sel
L+R
L+R x Volume
L
R
L x Volume
PB
TDA 9616H
FM-Audio Processing
LineSel
EXT2
OutSel
DecoderSel
TUNER
EXT1
SAP
Headphone Sel
OUT SEL
L
R
N
OutputSel
STEREO
LEFT
RIGHT
NORMAL
NOR+ST
NOR+L
NOR+R
mute
ALC
Mute
mute
Level
+15dB
0dB
mute
Env-Sel
OutSel
STEREO
IIC BUS CONTROL
TRIA_ALM
SDA
SCL
23
26
Socket PCB
Micro
MIC
CINCH Front
AINFL
AINFR
7520
Phones
IN/OUT (IO)
1954
CINCH Rear
AINBL
AINBR
SMART SOUND only
MSP3451G (3411G)
LM358
SFS
SOUND PROC.
4052
Mono only
1951
SCART1
AIN1L
AIN1R
1952
SCART2
AIN2L
AIN2R
AMCO
AOUT2L
AOUT2R
Port Expander (PE)
SFS (FV)
7091
Shift Register
Central Deck Control (AI01, AI02)
IME0 (ER)
HP2 (AF,HA)
MTA (AL)
SCL2 (AL)
SACO
IRAL (AL)
IRAF (HA)
SDA2 (AL)
7406
Central Controller
Head Amplifier (HA)
IRAF (AI01)
5VASWA
7102
7104
STV 5712
Head Ampl.
VCC
REC
FMAR
FMAP
20
21
HP2(AI01)
Head Drum
Linear-Audio (AL)
12VASW
34
SCL2(AI01) SDA2(AI01)
MTA(AI01)
7005
A-VCC
MUTE
Serial-Bus Control
LA71527M
Linear-Aud. Processing
ALC
Line
Mute
mute
Rec-Amp
EQ-Amp
PB
REC
A-GND
HD SW
7604
IRAL (AI01)
7608
Erase Osc.
BIAS
3626
32
7603
7605
7606
AEH1
AEH2
Audio Erase Head
ARH
APH
REC/PB Head
Tape Deck
(ER) Erase Oscillator
IMEO (AI02)
Erase Osc.
MEH1
MEH2
Main Erase Head

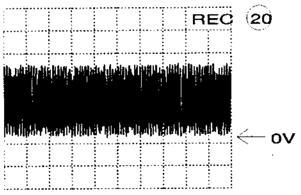
Oscillograms Block Diagram Audio



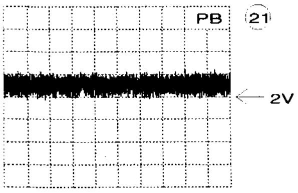
A: DC, 500mV/Div, 500us/Div
Tumod Pin 3



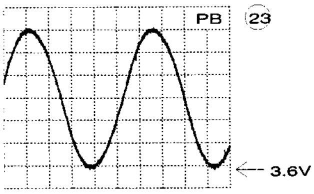
A: AC, 100mV/Div, 500us/Div
IC 7761 Pin 37/38



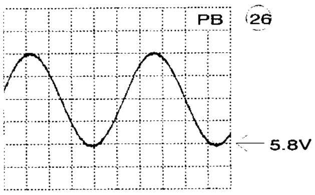
A: DC, 200mV/Div, 5ms/Div
FMAR



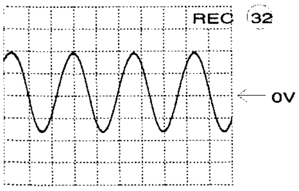
A: AC, 200mV/Div, 500us/Div
FMAP



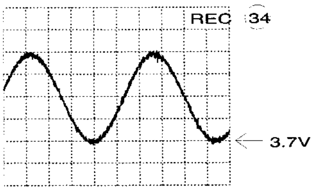
A: AC, 100mV/Div, 200us/Div
IC 7651 Pin 21



A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 18/19

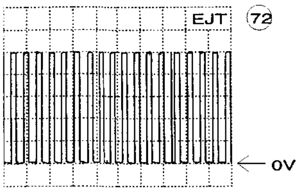


A: DC, 20 V/Div, 5us/Div
Connector 1960 Pin 1

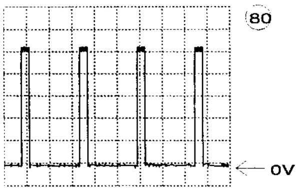


A: AC, 50mV/Div, 200us/Div
IC 7005 Pin 73

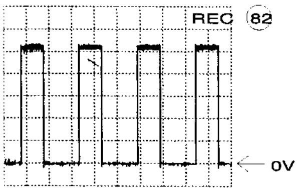
Oscillograms Block Diagram Digital



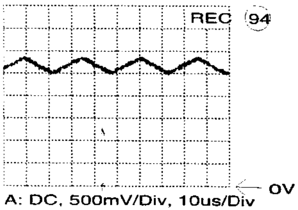
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



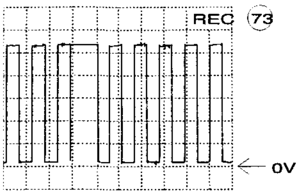
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 89



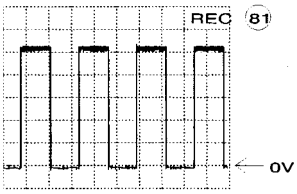
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 87



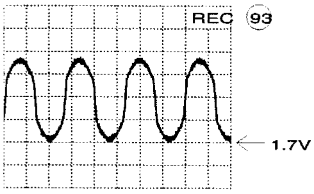
A: DC, 500mV/Div, 10us/Div
Connector 1946 Pin 6



A: DC, 1 V/Div, 2ms/Div
IC 7406 Pin 28

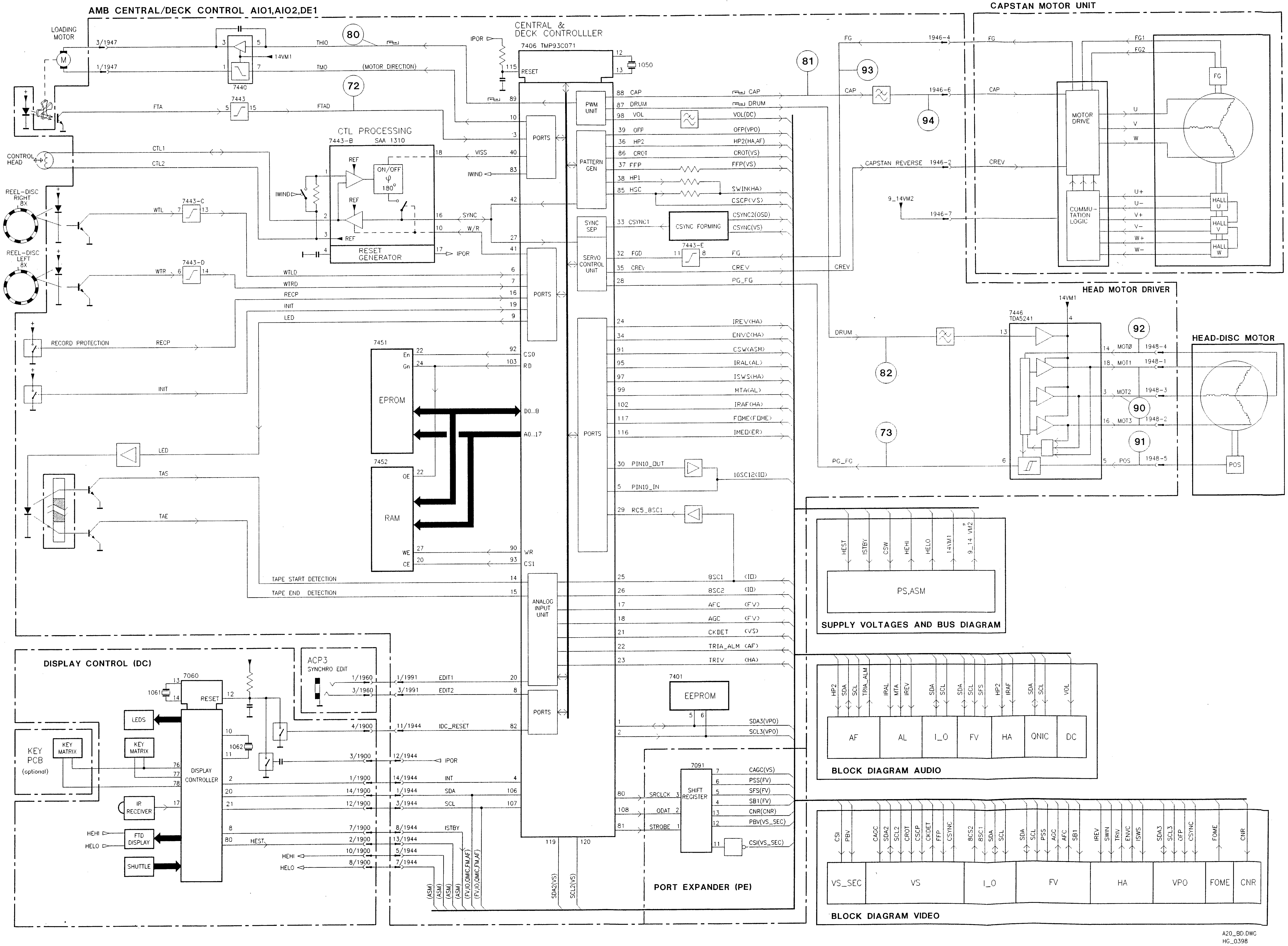


A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 88

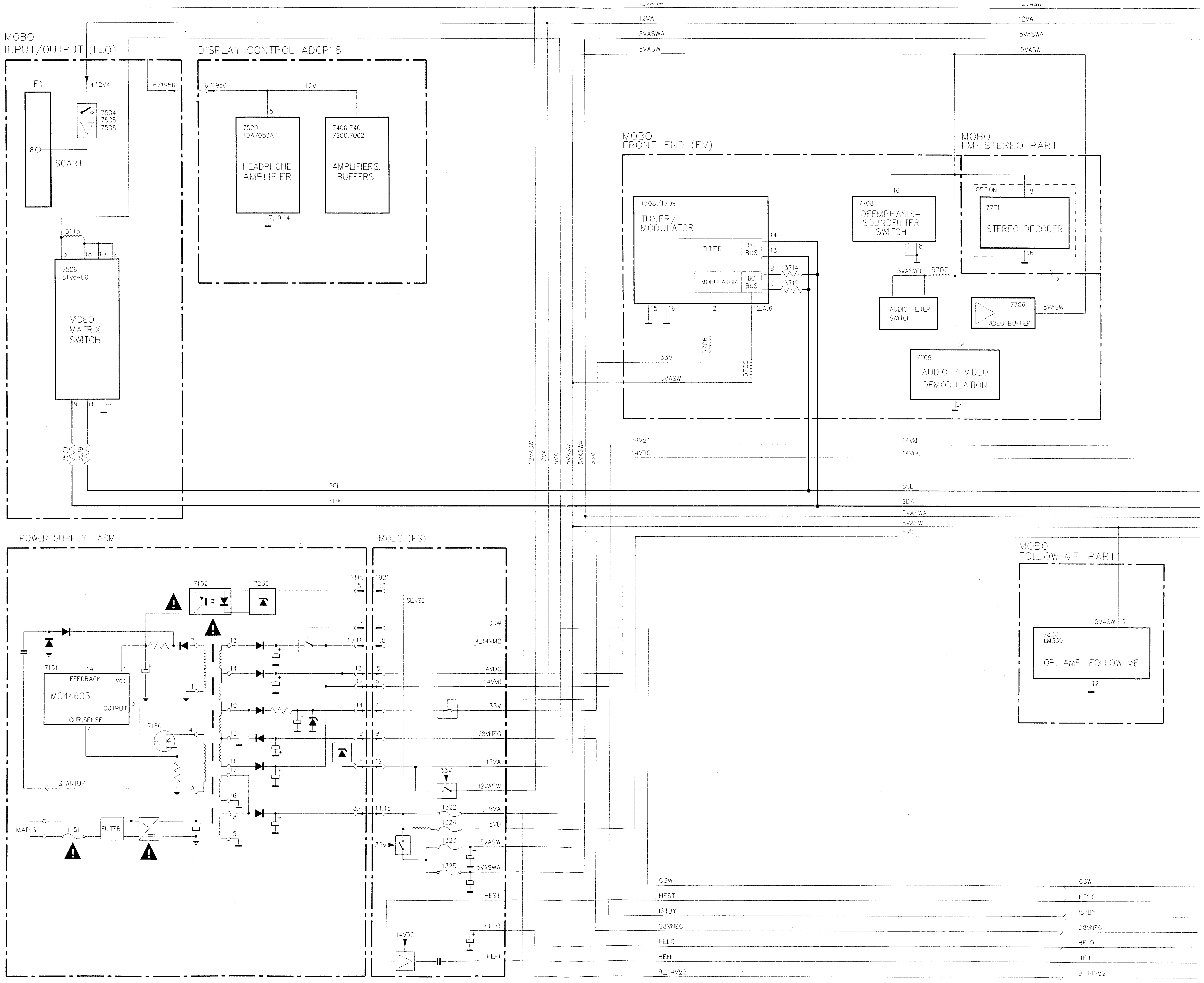


A: DC, 500mV/Div, 500us/Div
Connector 1946 Pin 4

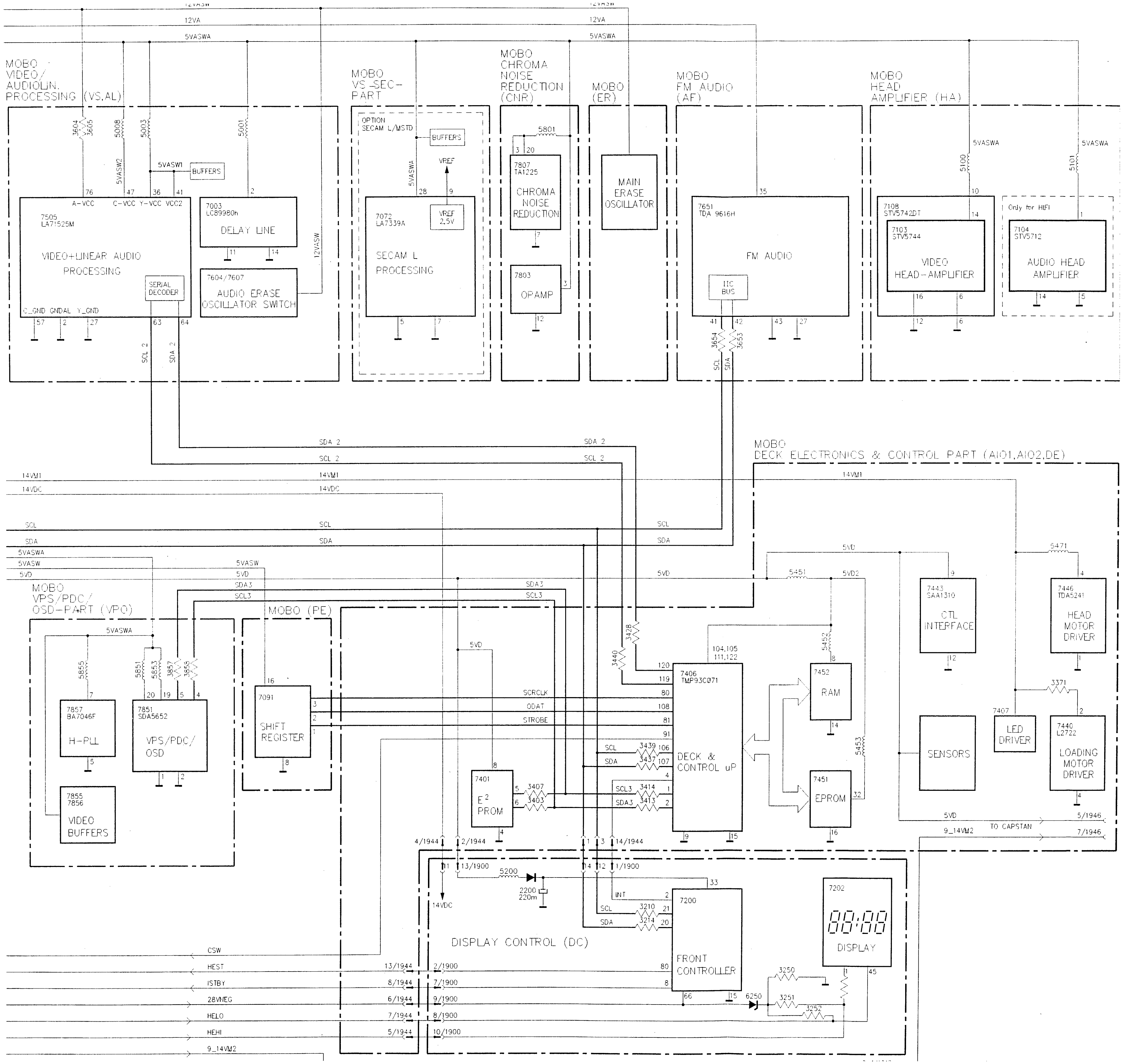
Block Diagram Digital


AMB CENTRAL/DECK CONTROL AIO1,AIO2,DE1
LOADING MOTOR
M
3/1947
1/1947
7440
14VM1
THIO
TMO
(MOTOR DIRECTION)
80
72
7443
FTA
FTAD
CONTROL HEAD
CTL1
CTL2
CTL PROCESSING
7443-B
SAA 1310
REF
ON/OFF
φ
180°
IWIND
RESET GENERATOR
IPOR
VISS
SYNC
W/R
REEL-DISC RIGHT 8X
7443-C
WTL
REEL-DISC LEFT 8X
7443-D
WTR
WTLD
WTRD
RECP
INIT
LED
RECORD PROTECTION
TAS
TAE
TAPE START DETECTION
TAPE END DETECTION
CENTRAL & DECK CONTROLLLER
7406 TMP93C071
RESET
1050
PWM UNIT
PORTS
PATTERN GEN
SYNC SEP
SERVO CONTROL UNIT
ANALOG INPUT UNIT
88 CAP
87 DRUM
98 VOL
39 OFF
36 HP2
86 CROT
37 FFP
38 HP1
85 HSC
33 CSYNC1
32 FGD
35 CREV
28
CAP
DRUM
VOL(DC)
OFP(VPO)
HP2(HA,AF)
CROT(VS)
FFP(VS)
SWIN(HA)
CSCP(VS)
CSYNC FORMING
CSYNC2(OSD)
CSYNC(VS)
7443-E
FG
CREV
PG_FG
24 IREV(HA)
34 ENVC(HA)
91 CSW(ASM)
95 IRAL(AL)
97 ISWS(HA)
99 MTA(AL)
102 IRAF(HA)
117 FOME(FOME)
116 IMED(ER)
30 PIN10_OUT
5 PIN10_IN
1OSC12(ID)
29 RC5_8SC1
25 8SC1 (ID)
26 8SC2 (ID)
17 AFC (FV)
18 AGC (FV)
21 CKDET (VS)
22 TRIA_ALM (AF)
23 TRIV (HA)
7451
EPROM
En
Gn
CS0
RD
D0..8
A0..17
7452
RAM
OE
WE
CE
WR
CS1
7401
EEPROM
SDA3(VPO)
SCL3(VPO)
119
120
SDA2(VS)
SCL2(VS)
81
93
94
82
73
CAPSTAN MOTOR UNIT
1946-4
1946-6
CAPSTAN REVERSE 1946-2
9_14VM2
1946-7
FG1
FG2
MOTOR DRIVE
COMMUTATION LOGIC
U
V
W
U+
U-
V+
V-
W+
W-
HALL U
HALL V
HALL W
HEAD MOTOR DRIVER
14VM1
7446
TDA5241
DRUM
PG_FG
MOTØ 1948-4
MOT1 1948-1
MOT2 1948-3
MOT3 1948-2
POS 1948-5
92
90
91
HEAD-DISC MOTOR
POS
HEST
ISTBY
CSW
HEHI
HELO
14VM1
9_14 VM2
PS,ASM
SUPPLY VOLTAGES AND BUS DIAGRAM
HP2
SDA
SCL
TRIA_ALM
IRAL
MTA
IREV
SFS
IRAF
VOL
AF
AL
I_O
FV
HA
QNIC
DC
BLOCK DIAGRAM AUDIO
PORT EXPANDER (PE)
7091
SHIFT REGISTER
SRCLCK
ODAT
STROBE
CAGC(VS)
PSS(FV)
SFS(FV)
SB1(FV)
CNR(CNR)
PBV(VS_SEC)
CSI(VS_SEC)
CSI
PBV
CAGC
SDA2
SCL2
CROT
CSCP
CKDET
FFP
CSYNC
8CS2
8SC1
PSS
AGC
AFC
SB1
SWIN
TRIV
ENVC
ISWS
SDA3
SCL3
OFP
FOME
CNR
VS_SEC
VS
VPO
BLOCK DIAGRAM VIDEO
DISPLAY CONTROL (DC)
7060
1061
RESET
LEDS
KEY MATRIX
KEY PCB (optional)
DISPLAY CONTROLLER
1062
IR RECEIVER
HEHI
HELO
FTD DISPLAY
SHUTTLE
ACP3
SYNCHRO EDIT
1/1960 1/1991 EDIT1
3/1960 3/1991 EDIT2
4/1900 11/1944 IDC_RESET
3/1900 12/1944 IPOR
1/1900 14/1944 INT
14/1900 1/1944 SDA
12/1900 3/1944 SCL
7/1900 8/1944 ISTBY
2/1900 13/1944 HEST
10/1900 5/1944
8/1900 7/1944
(ASM)
(FV,IO,QMIC,FM,AF)
A20_BD.DWG
HG_0398

Block Diagram Supply & I^{2}C

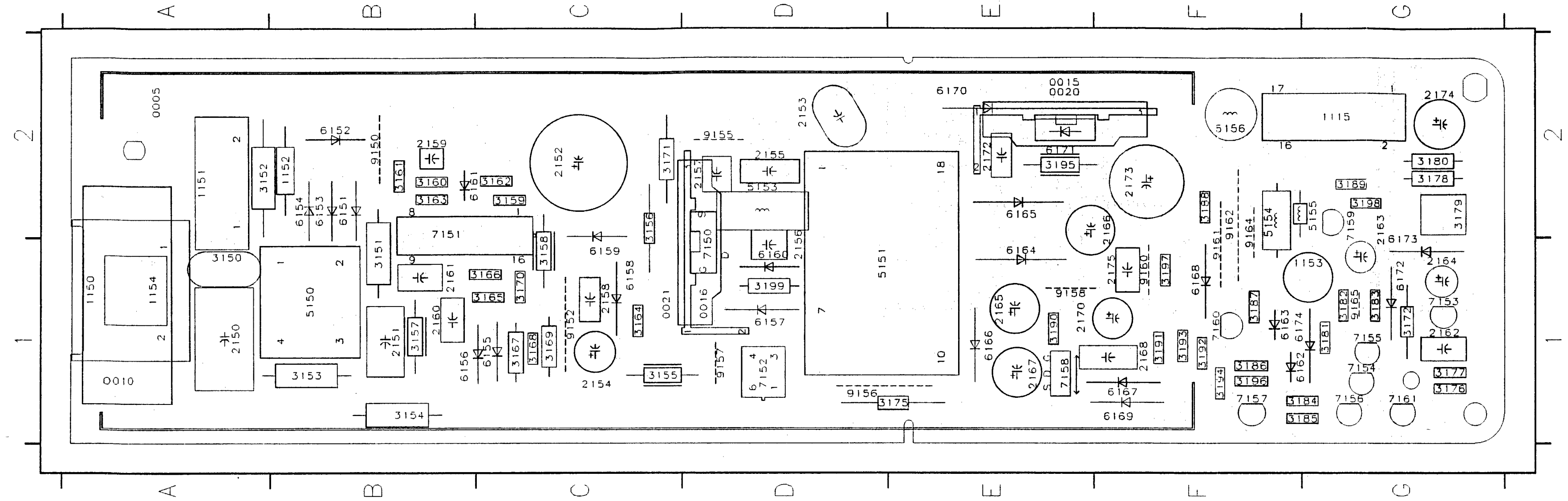

MOBO
INPUT/OUTPUT (I_O)
E1
8
SCART
+12VA
7504
7505
7508
5115
3
18
19
20
7506
STV6400
VIDEO MATRIX SWITCH
9
11
14
3530
3529
6/1956
DISPLAY CONTROL ADCP18
6/1950
12V
5
7520
TDA7053AT
HEADPHONE AMPLIFIER
7,10,14
7400,7401
7200,7002
AMPLIFIERS, BUFFERS
12VASW
12VA
5VASWA
5VASW
MOBO
FRONT END (FV)
1708/1709
TUNER/ MODULATOR
TUNER
IIC BUS
MODULATOR
IIC BUS
14
13
B
C
3714
3712
15
16
2
12,A,6
5706
5705
33V
5VASW
7708
DEEMPHASIS+ SOUNDFILTER SWITCH
16
7
8
5VASWB
5707
AUDIO FILTER SWITCH
7705
AUDIO / VIDEO DEMODULATION
26
24
MOBO
FM-STEREO PART
OPTION
18
7771
STEREO DECODER
16
7706
VIDEO BUFFER
5VASW
12VASW
12VA
5VA
5VASW
5VASWA
33V
14VM1
14VDC
SCL
SDA
5VASWA
5VASW
5VD
MOBO
FOLLOW ME-PART
5VASW
3
7830
LM339
OP. AMP. FOLLOW ME
12
POWER SUPPLY ASM
7152
7235
7151
FEEDBACK
Vcc
MC44603
OUTPUT
CUR.SENSE
14
1
3
7
7150
4
STARTUP
MAINS
1151
FILTER
13
14
10
12
11
17
16
18
15
MOBO (PS)
1115
1921
SENSE
CSW
9_14VM2
14VDC
14VM1
33V
28VNEG
12VA
12VASW
33V
1322
5VA
1324
5VD
1323
5VASW
1325
5VASWA
HEST
HELO
14VDC
HEHI
CSW
HEST
ISTBY
28VNEG
HELO
HEHI
9_14VM2

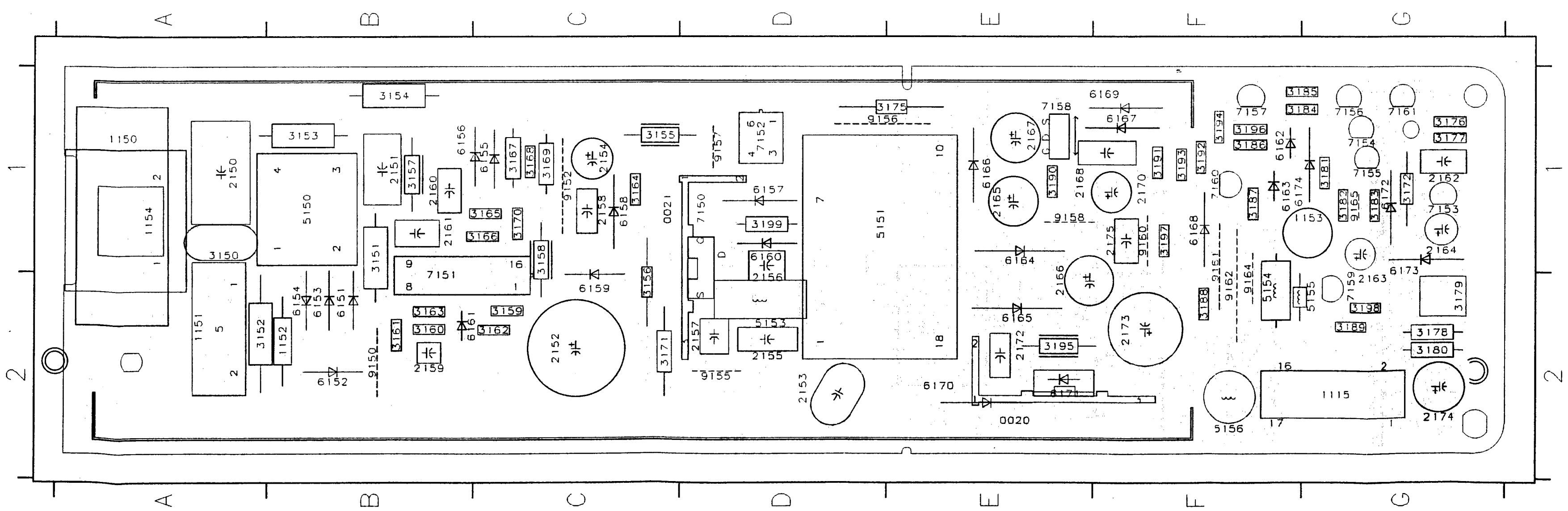
Block Diagram Supply & I^{2}C

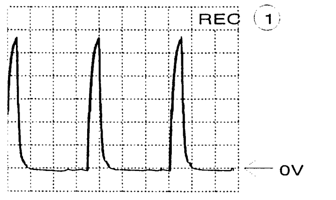

12VA
5VASWA
MOBO VIDEO/ AUDIOLIN. PROCESSING (VS,AL)
3604
3605
5008
5003
5001
5VASW2
5VASW1
BUFFERS
A-VCC
C-VCC
Y-VCC
VCC2
7505
LA71525M
VIDEO+LINEAR AUDIO PROCESSING
SERIAL DECODER
C_GND GNDAL Y_GND
7003
LC89980n
DELAY LINE
7604/7607
AUDIO ERASE OSCILLATOR SWITCH
12VASW
SCL 2
SDA 2
MOBO VS -SEC- PART
OPTION SECAM L/MSTD
BUFFERS
5VASWA
VREF
VREF 2.5V
7072
LA7339A
SECAM L PROCESSING
MOBO CHROMA NOISE REDUCTION (CNR)
5801
7807
TA1225
CHROMA NOISE REDUCTION
7803
OPAMP
MOBO (ER)
MAIN ERASE OSCILLATOR
MOBO FM AUDIO (AF)
7651
TDA 9616H
FM AUDIO
IIC BUS
3654
3653
SCL
SDA
MOBO HEAD AMPLIFIER (HA)
5VASWA
5100
5101
7108
STV5742DT
7103
STV5744
VIDEO HEAD-AMPLIFIER
Only for HIFI
7104
STV5712
AUDIO HEAD AMPLIFIER
SDA 2
SCL 2
MOBO DECK ELECTRONICS & CONTROL PART (AI01,AI02,DE)
14VM1
14VDC
SCL
SDA
5VASWA
5VASW
5VD
5VD2
5451
5471
MOBO VPS/PDC/ OSD-PART (VPO)
5VASWA
5855
5851
5653
3857
3858
7857
BA7046F
H-PLL
7851
SDA5652
VPS/PDC/ OSD
7855
7856
VIDEO BUFFERS
MOBO (PE)
SDA3
SCL3
7091
SHIFT REGISTER
SCRCLK
ODAT
STROBE
5VD
7401
E^2 PROM
3407
3403
3428
3440
104,105
111,122
7406
TMP93C071
DECK & CONTROL uP
3439
3437
3414
3413
SCL3
SDA3
5452
7452
RAM
5453
7451
EPROM
7443
SAA1310
CTL INTERFACE
SENSORS
7446
TDA5241
HEAD MOTOR DRIVER
3371
7407
LED DRIVER
7440
L2722
LOADING MOTOR DRIVER
5VD
9_14VM2
TO CAPSTAN
5/1946
7/1946
4/1944
2/1944
14/1944
13/1900
1/1900
5200
2200
220m
14VDC
INT
SCL
SDA
3210
3214
7200
FRONT CONTROLLER
DISPLAY CONTROL (DC)
7202
88:88
DISPLAY
3250
3251
3252
6250
CSW
HEST
ISTBY
28VNEG
HELO
HEHI
9_14VM2
13/1944
8/1944
6/1944
7/1944
5/1944
2/1900
7/1900
9/1900
8/1900
10/1900

Power Supply (ASM)

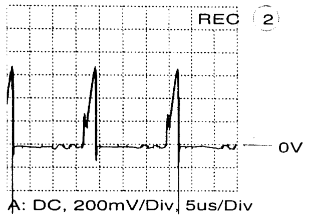
0005	A2
0010	A1
0015	E2
0016	D1
0020	E2
0021	C1
1115	G2
1150	A1
1151	A2
1152	B2
1153	G1
1154	A1
2150	A1
2151	B1
2152	C2
2153	D2
2154	C1
2155	D2
2156	D1
2157	D2
2158	C1
2159	B2
2160	B1
2161	B1
2162	G1
2163	G2
2164	G1
2165	E1
2166	F2
2167	E1
2168	F1
2170	E1
2172	E2
2173	F2
2174	G2
2175	F1
3150	A1
3151	B1
3152	A2
3153	B1
3154	B1
3155	C1
3156	C2
3157	B1
3158	C1
3159	C2
3160	B2
3161	B2
3162	C2
3163	B2
3164	C1
3165	C1
3166	C1
3167	C1
3168	C1
3169	C1
3170	C1
3171	C2
3172	G1
3175	E1
3176	G1
3177	G1
3178	G2
3179	G2
3180	G2
3181	G1
3182	G1
3183	G1
3184	G1
3185	G1
3186	F1
3187	F1
3188	F2
3189	G2
3190	E1
3191	F1
3192	F1
3193	F1
3194	F1
3195	E2
3196	F1
3197	F1
3198	G2
3199	D1
5150	B1
5151	D1
5153	D2
5154	F2
5155	G2
5156	F2
6151	B2
6152	B2
6153	B2
6154	B2
6155	C1
6156	B1
6157	D1
6158	C1
6159	C1
6160	D1
6161	B2
6162	F1
6163	F1
6164	E1
6165	E2
6166	E1
6167	F1
6168	F1
6169	F1
6170	E2
6171	E2
6172	G1
6173	G1
6174	F1
7150	D1
7151	B2
7152	D1
7153	G1
7154	G1
7155	G1
7156	G1
7157	F1
7158	E1
7159	G2
7160	F1
7161	G1
9150	B2
9152	C1
9155	D2
9156	D1
9157	D1
9158	E1
9160	F1
9161	F1
9162	F2
9164	F2
9165	G1



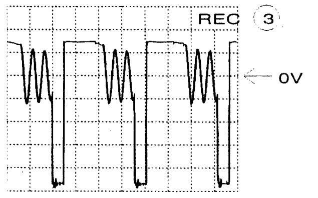




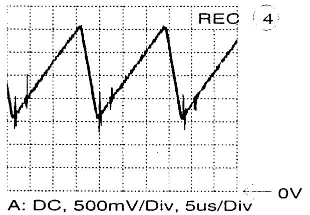
A: DC, 2 V/Div, 5us/Div
Gate 7150



A: DC, 200mV/Div, 5us/Div
Source 7150

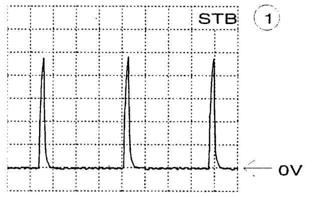


A: DC, 10 V/Div, 5us/Div
5151 Pin 7

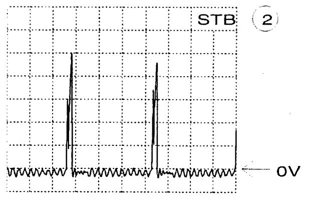


A: DC, 500mV/Div, 5us/Div
IC 7151 Pin 10

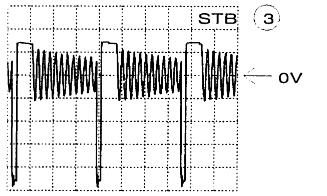
Low Power Standby



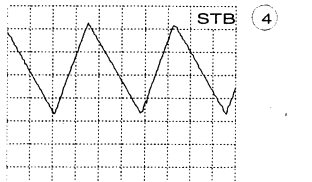
A: DC, 2 V/Div, 10us/Div
Gate 7150



A: DC, 100mV/Div, 10us/Div
Source 7150



A: DC, 10 V/Div, 10us/Div
5151 Pin 7



A: DC, 500mV/Div, 10us/Div
IC 7151 Pin 10

Power Supply (ASM)

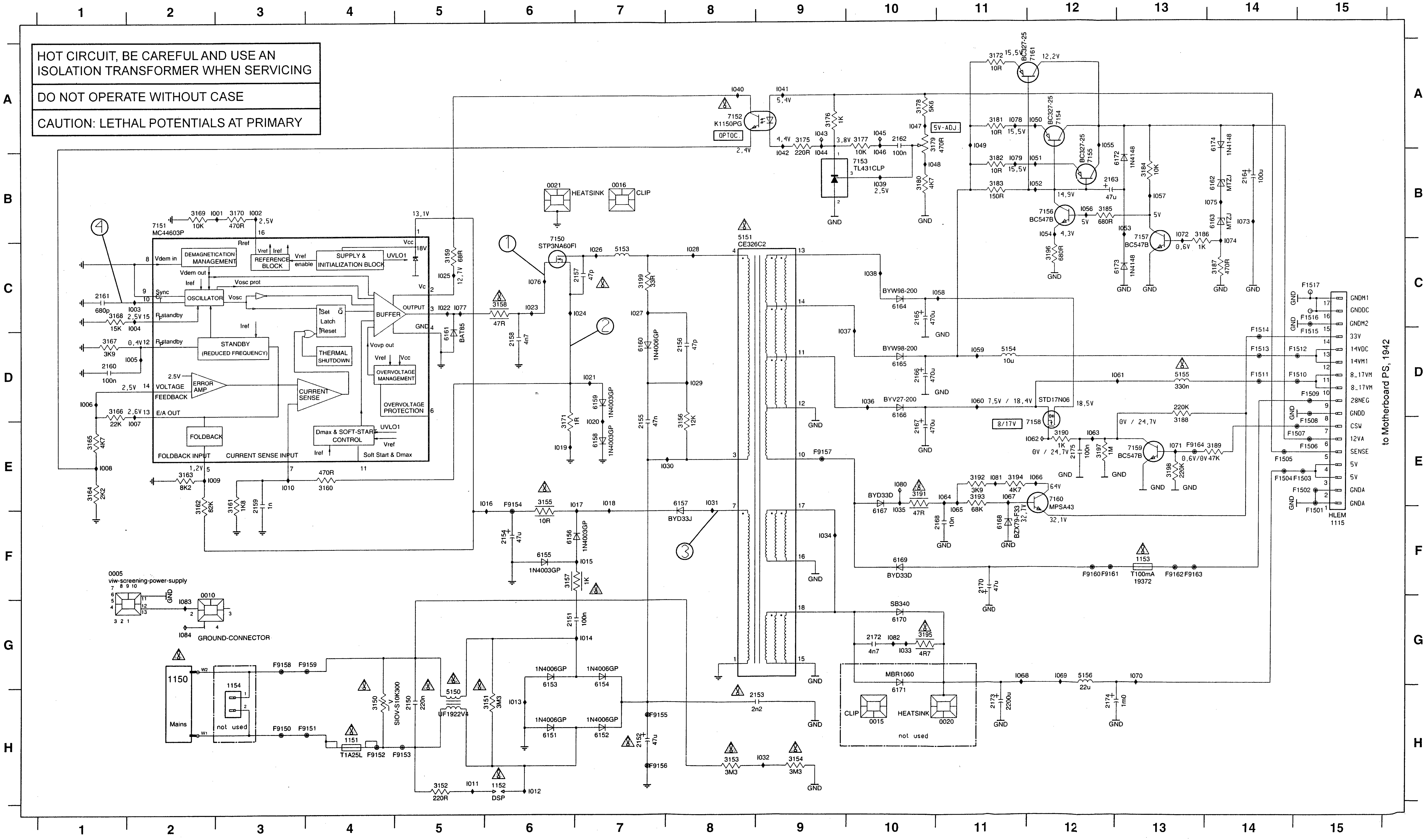
Interconnections		Manual Page						
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

0005	F1
0010	F2
0015	H10
0016	B7
0020	H11
0021	B6
1115	F15
1150	G2
1151	H4
1152	H6
1153	F13
1154	G3
2150	H5
2151	G6
2152	H7
2153	H9
2154	F6
2155	E7
2156	D8
2157	C7
2158	D6
2159	E3
2160	D1
2161	C1
2162	A10
2163	B12
2164	B14
2165	C10
2166	D10
2167	E10
2168	F11
2170	F11
2172	G10
2173	H11
2174	H12
2175	E12
3150	H4
3151	H6
3152	H5
3153	H8
3154	H9
3155	E6
3156	E8
3157	F6
3158	C6
3159	C5
3160	E4
3161	E3
3162	E2
3163	E2
3164	E1
3165	E1
3166	D1
3167	D1
3168	C1
3169	B2
3170	B3
3171	E6
3172	A11
3175	A9
3176	A9
3177	A10
3178	A10
3179	A10
3180	B10
3181	A11
3182	B11
3183	B11
3184	B13
3185	B12
3186	B13
3187	C14
3188	E13
3189	E14
3190	E12
3191	E10
3192	E11
3193	E11
3194	E11
3195	G10
3196	C12
3197	E12
3198	E13
3199	C7
5150	H5
5151	B8
5153	C7
5154	D11
5155	D13
5156	G12
6151	H6
6152	H7
6153	G6
6154	G7
6155	F6
6156	F6
6157	E8
6158	E7
6159	D7
6160	D7
6161	D5
6162	B14
6163	B14
6164	C10
6165	D10
6166	D10
6167	F10
6168	F11
6169	F10
6170	G10
6171	H10
6172	B13
6173	C13
6174	A14
7150	C6
7151	B2
7152	A8
7153	B10
7154	A12
7155	B12
7156	B12
7157	C13
7158	E12
7159	E13
7160	E12
7161	A12
F1501	F15
F1502	E15
F1503	E15
F1504	E14
F1505	E14
F1506	E15
F1507	E15
F1508	E15
F1509	D15
F1510	D15
F1511	D14
F1512	D15
F1513	D14
F1514	D14
F1515	D15
F1516	C15
F1517	C15
F9150	H3
F9151	H4
F9152	H4
F9153	H5
F9154	E6
F9155	H7
F9156	H7
F9157	E9
F9158	G3
F9159	G4
F9160	F12
F9161	F12
F9162	F13
F9163	F13
F9164	E13
I001	B3
I002	B3
I003	C2
I004	C2
I005	D2
I006	D1
I007	E2
I008	E1
I009	E2
I010	E3
I011	H5
I012	H6
I013	H6
I014	G7
I015	F7
I016	E6
I017	E7
I018	E7
I019	E6
I020	E7
I021	D7
I022	C5
I023	C6
I024	C7
I025	C5
I026	C7
I027	C7
I028	C8
I029	D8
I030	E8
I031	E8
I032	H9
I033	G10
I034	F9
I035	F10
I036	D10
I037	D9
I038	C10
I039	B10
I040	A8
I041	A9
I042	B9
I043	A9
I044	B9
I045	A10
I046	B10
I047	A10
I048	B10
I049	A11
I050	A12
I051	B12
I052	B12
I053	B13
I054	B12
I055	A12
I056	B12
I057	B13
I058	C11
I059	D11
I060	D11
I061	D13
I062	E12
I063	E12
I064	E11
I065	F11
I066	E12
I067	E11
I068	G11
I069	G12
I070	G13
I071	E13
I072	B13
I073	B14
I074	C14
I075	B14
I076	C6
I077	C5
I078	A11
I079	B11
I080	E10
I081	E11
I082	G10
I083	G2
I084	G2

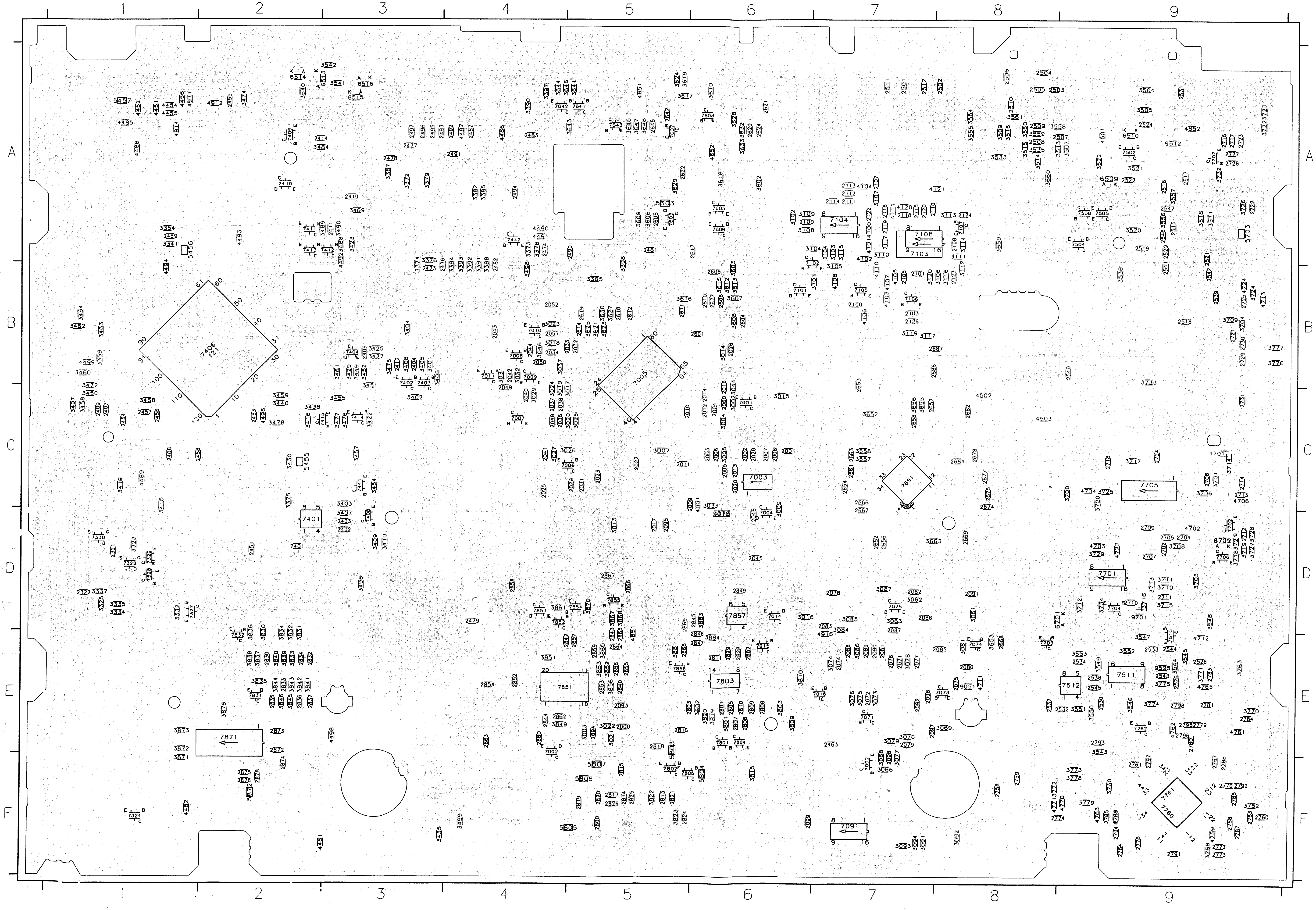
HOT CIRCUIT, BE CAREFUL AND USE AN ISOLATION TRANSFORMER WHEN SERVICING

DO NOT OPERATE WITHOUT CASE

CAUTION: LETHAL POTENTIALS AT PRIMARY


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
7151
MC44603P
DEMAGNETICATION MANAGEMENT
REFERENCE BLOCK
SUPPLY & INITIALIZATION BLOCK
UVLO1
OSCILLATOR
BUFFER
STANDBY (REDUCED FREQUENCY)
THERMAL SHUTDOWN
OVERVOLTAGE MANAGEMENT
OVERVOLTAGE PROTECTION
ERROR AMP
CURRENT SENSE
FOLDBACK
Dmax & SOFT-START CONTROL
VOLTAGE FEEDBACK
E/A OUT
FOLDBACK INPUT
CURRENT SENSE INPUT
Soft Start & Dmax
7150
STP3NA60FI
5151
CE326C2
7152
K1150PG
OPTOC.
7153
TL431CLP
5V-ADJ
7161
BC327-25
7154
BC327-25
7155
BC327-25
7156
BC547B
7157
BC547B
7158
STD17N06
8/17V
7159
BC547B
7160
MPSA43
0021
HEATSINK
0016
CLIP
BYW98-200
BYV27-200
BYD33D
BYD33J
SB340
MBR1060
1N4003GP
1N4006GP
1N4148
MTZJ
BZX79-F33
BAT85
5150
UF1922V4
SIOV-S10K300
1151
T1A25L
1152
DSP
1153
T100mA
19372
1150
Mains
1154
not used
0005
viw-screening-power-supply
0010
GROUND-CONNECTOR
CLIP
0015
HEATSINK
0020
not used
HLEM
1115
GNDM1
GNDDC
GNDM2
33V
14VDC
14VM1
8_17VM
8_17VM
28NEG
GNDD
CSW
12VA
SENSE
5V
5V
GNDA
GNDA
to Motherboard PS, 1942
GND

Motherboard (MOBO)


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
7406
7005
7003
7651
7104
7108
7103
7401
7705
7701
7511
7512
7851
7857
7803
7871
7091
7761

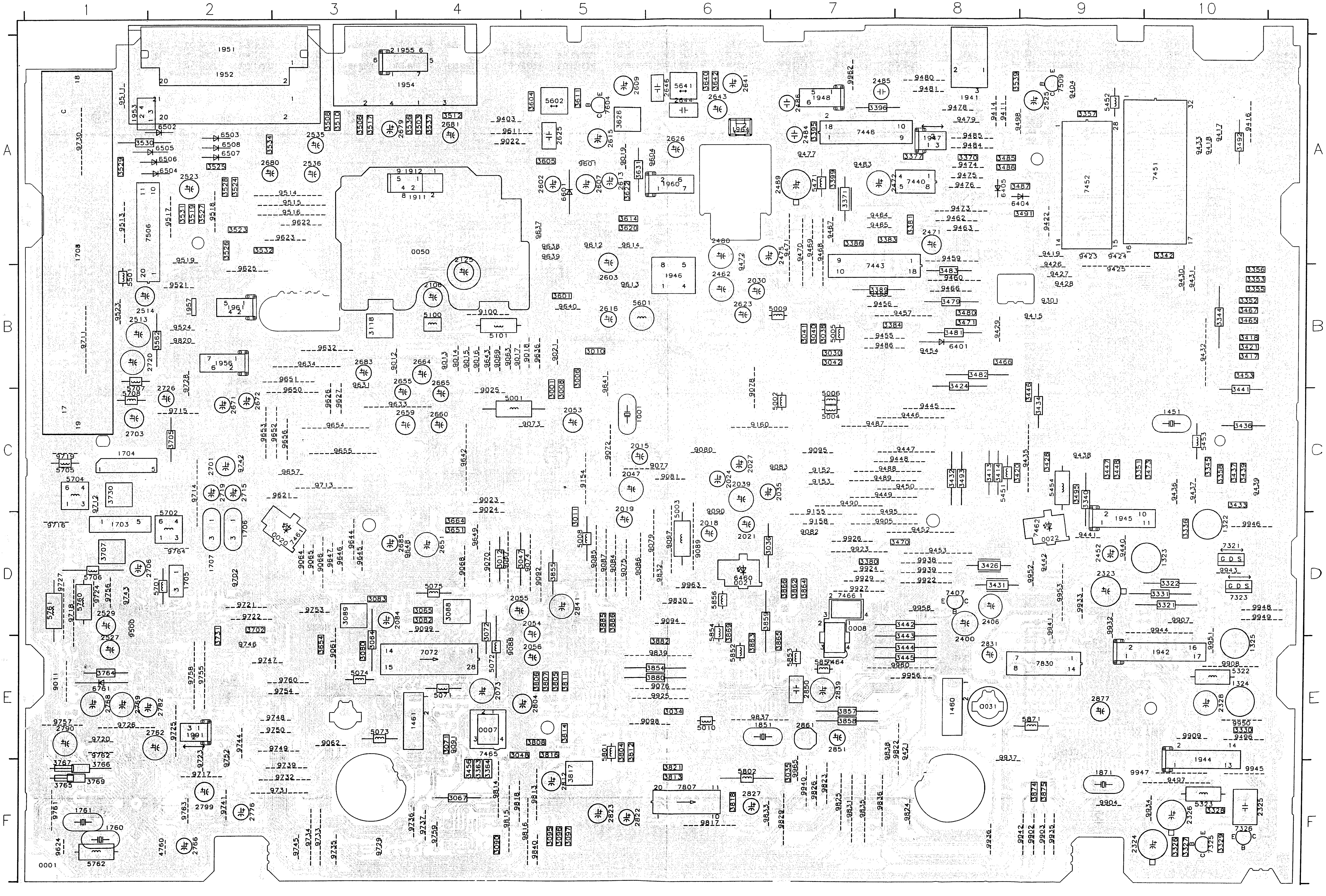
Component Mapping Motherboard

2000	E5
2001	C6
2002	C6
2003	C6
2004	C6
2005	C6
2006	C6
2007	C6
2008	C6
2009	C5
2010	C5
2011	C5
2012	C6
2013	C6
2014	C6
2016	C6
2017	D5
2020	C6
2022	C5
2023	C5
2025	C4
2026	B6
2028	C6
2029	C5
2031	C5
2032	B5
2033	B4
2034	B4
2036	C4
2037	C4
2038	C4
2040	C4
2041	C4
2042	B4
2043	B4
2044	B4
2045	D6
2046	D6
2048	C4
2049	C4
2050	B4
2052	B4
2057	B4
2060	C6
2071	E7
2072	E7
2074	E7
2075	E8
2076	E7
2077	E7
2078	D7
2079	E7
2080	E8
2081	E7
2082	D7
2083	D7
2085	E8
2086	D7
2087	D7
2088	E7
2089	E7
2090	E7
2091	D8
2092	E7
2093	E5
2094	E5
2095	D5
2096	E7
2097	E7
2098	F7
2099	F6
2100	B7
2101	B7
2103	B7
2104	A7
2105	B7
2107	A7
2108	A8
2109	A6
2110	A7
2111	A7
2112	A7
2113	A7
2114	A7
2115	A7
2116	A7
2117	A7
2118	A7
2119	A7
2120	A7
2122	A7
2123	B8
2124	A8
2126	B7
2321	D1
2322	D1
2401	D2
2402	D3
2403	D3
2404	B3
2405	B3
2407	C1
2408	C1
2409	C1
2410	A3
2411	A3
2412	B3
2414	A2
2451	D2
2453	C2
2454	C1
2455	A2
2456	C1
2457	C1
2458	C1
2459	A1
2461	A5
2463	E7
2473	B3
2474	A4
2476	B3
2477	A3
2478	A3
2479	D4
2482	B4
2483	A4
2487	A4
2490	A5
2491	A4
2492	A4
2493	A3
2494	A4
2495	A3
2496	A3
2497	A3
2501	A7
2502	A8
2503	A8
2504	A8
2505	A8
2506	A8
2507	A9
2508	A8
2509	A8
2510	A8
2511	A7
2512	A7
2515	A9
2516	B9
2517	A9
2518	A9
2519	A9
2520	A9
2521	A9
2522	A9
2524	A9
2526	E9
2528	E9
2530	E9
2531	A9
2532	E9
2533	E9
2534	E9
2537	E8
2538	E9
2539	B9
2540	B9
2541	B9
2542	B9
2543	E9
2544	E9
2545	E9
2546	A9
2547	A9
2601	B6
2604	B6
2605	A5
2606	B6
2608	B6
2610	B6
2611	B5
2612	B5
2614	B5
2617	A6
2618	B5
2619	B5
2620	A6
2621	A6
2622	A5
2624	A6
2627	B6
2642	A5
2645	A5
2652	D7
2653	B7
2654	C7
2656	D7
2657	C7
2658	C7
2661	C7
2662	D7
2663	C7
2666	C7
2668	E8
2669	D8
2674	C8
2675	C8
2677	C8
2678	C8
2682	C8
2684	C8
2686	B7
2687	B7
2702	D9
2704	D9
2705	D9
2707	D9
2708	C9
2709	D9
2710	D9
2711	D9
2712	D9
2713	C9
2714	C9
2716	A9
2717	A9
2718	C9
2721	B9
2722	A9
2723	A9
2724	C9
2725	B9
2727	A9
2728	A9
2729	B9
2730	B9
2731	C9
2758	F8
2759	F8
2760	F9
2761	F9
2763	F9
2764	F9
2765	F9
2767	F9
2770	F9
2771	F9
2772	F9
2773	F9
2774	F9
2775	F9
2778	F9
2779	E9
2780	E9
2781	E9
2783	E9
2784	E9
2785	F9
2786	F9
2787	F9
2788	F9
2789	F9
2791	F9
2792	F9
2793	E9
2794	F9
2795	E9
2796	E9
2797	F9
2798	E9
2800	F5
2801	E6
2802	E6
2803	E5
2805	E6
2806	E6
2807	E6
2808	E6
2809	E6
2810	E6
2811	E6
2813	F5
2814	F5
2815	F5
2816	E5
2817	F5
2818	E5
2819	F5
2820	F5
2821	F5
2824	F5
2825	F5
2826	F5
2828	E6
2829	E6
2830	E2
2832	E2
2833	E2
2834	E2
2835	E2
2836	E2
2837	E2
2840	E5
2842	E4
2843	E5
2844	E4
2845	D6
2846	E6
2847	E6
2849	D6
2852	E4
2853	E5
2854	E4
2855	E5
2856	E5
2857	E5
2858	D4
2859	E5
2860	E4
2862	E4
2863	E4
2864	E5
2865	E5
2866	D5
2867	D5
2868	E5
2869	D5
2872	E2
2873	E2
2874	F2
2875	F2
2876	F2
2878	F2
3002	C6
3003	E5
3004	C6
3005	C6
3007	C5
3009	D6
3013	D5
3014	B6
3015	C6
3016	D6
3017	C4
3018	B4
3019	C4
3020	C5
3021	E5
3022	E5
3023	B4
3024	C4
3025	C5
3026	C5
3027	C4
3029	C4
3031	B4
3032	B4
3033	C6
3037	B4
3044	C6
3046	B4
3061	D8
3062	D7
3063	D7
3066	F7
3068	F7
3069	E8
3070	E7
3073	E7
3074	E7
3075	E7
3076	E7
3077	F7
3078	E7
3079	E7
3081	E8
3084	D7
3085	D7
3086	E7
3087	D7
3091	F7
3092	F8
3093	F7
3094	F7
3101	B7
3102	A6
3103	A7
3104	A6
3105	B7
3106	B8
3107	A7
3108	A6
3109	A6
3110	A7
3111	A8
3112	B8
3113	A8
3114	A8
3115	A7
3116	B8
3117	B7
3119	B7
3120	B7
3323	D1
3325	D1
3332	D1
3334	D1
3335	D1
3337	D1
3341	A1
3354	A1
3359	B1
3365	B5
3372	A3
3373	A4
3374	B3
3375	C2
3376	A3
3378	A4
3379	A3
3382	A4
3385	A4
3387	A3
3388	B4
3390	A4
3391	B4
3392	B4
3393	B4
3394	B4
3397	A4
3398	B5
3401	B3
3402	C3
3403	C3
3404	B3
3405	B3
3406	B3
3407	D3
3408	B3
3409	D3
3410	D3
3415	C1
3416	C2
3419	C1
3422	C3
3423	A3
3425	B3
3427	B3
3429	B3
3430	C2
3435	F3
3438	C2
3440	C2
3449	B3
3450	C1
3451	C3
3452	B3
3454	C3
3455	C3
3457	C3
3458	C1
3459	C2
3460	B1
3461	B3
3462	B1
3463	B1
3464	B1
3468	C1
3469	A3
3472	C1
3474	A2
3475	B3
3476	C3
3477	C3
3478	C2
3484	A2
3488	A3
3489	A2
3490	A3
3496	D3
3497	C1
3498	B4
3499	F4
3504	A9
3505	A9
3507	A9
3509	A8
3511	A9
3513	A8
3514	A8
3515	A8
3516	A8
3518	A9
3520	A9
3521	A9
3522	A9
3533	A8
3535	A8
3538	B9
3540	A2
3541	A3
3542	A3
3543	E9
3544	E9
3545	E9
3546	E9
3547	E9
3548	D9
3549	E9
3550	E9
3551	E9
3552	E9
3553	E9
3554	A8
3555	A8
3556	A9
3557	A9
3558	A8
3559	A8
3560	A8
3561	A8
3602	A6
3603	B6
3606	A5
3607	B6
3608	B6
3609	A5
3610	A6
3612	B6
3613	B6
3615	B6
3616	B5
3617	A5
3618	A6
3619	A5
3621	B5
3623	B5
3624	A5
3625	B5
3627	B5
3628	A6
3629	A5
3630	B5
3632	A6
3633	A6
3641	A5
3643	A5
3644	A4
3645	A5
3646	A4
3647	A5
3648	A5
3652	C7
3653	E8
3655	C7
3656	C7
3657	C7
3658	C7
3659	A8
3660	A8
3663	D7
3700	C9
3701	C9
3703	D9
3704	B9
3706	C9
3708	D9
3709	B9
3710	D9
3711	D9
3712	D9
3713	D9
3714	C9
3715	D9
3716	D9
3717	C9
3718	D9
3719	D9
3720	C9
3721	D9
3722	A9
3723	A9
3724	B9
3725	C9
3726	A9
3727	D9
3728	D9
3729	D9
3732	A9
3733	B9
3734	D9
3760	F9
3762	F9
3763	E9
3768	F9
3770	E9
3771	E9
3772	F8
3773	F9
3774	E9
3775	E9
3776	B9
3777	B9
3778	F9
3779	F9
3801	E6
3802	E6
3803	E6
3809	E6
3810	E6
3815	F6
3819	E6
3820	E6
3822	F5
3823	F5
3830	E2
3831	E2
3832	E2
3833	E2
3834	E2
3835	E2
3836	E2
3837	E2
3838	E2
3839	E2
3840	E2
3841	E2
3842	E2
3843	E2
3844	E2
3845	E2
3846	E2
3849	E4
3851	E4
3852	E5
3853	E5
3856	E5
3860	E5
3861	D4
3867	D5
3868	D5
3870	D5
3871	F1
3872	E1
3873	E1
3876	E2
3881	E5
3883	D6
3884	E6
4001	C6
4100	A7
4101	A7
4102	A7
4103	B7
4104	A7
4105	B7
4106	B7
4107	B7
4108	B7
4110	B7
4111	A7
4112	D6
4120	A7
4121	A8
4451	A1
4452	A1
4454	A1
4455	A1
4456	A1
4481	F2
4482	F1
4485	A1
4486	A4
4487	A4
4488	A1
4489	C1
4490	A4
4491	A4
4492	A3
4493	A2
4494	B1
4496	C2
4498	E3
4499	B1
4501	A9
4502	C8
4503	C8
4651	A5
4652	A6
4701	C9
4702	D9
4703	D9
4704	C9
4705	D9
4706	C9
4711	E8
4712	E9
4713	B9
4722	D9
4724	B9
4759	F9
4761	E9
4762	E9
4763	F9
4764	F9
4765	E9
4770	F9
4771	F8
4851	E5
4852	A9
4911	A1
4912	A2
4914	A1
4916	E7
5076	D6
5455	C2
5456	A1
5457	A1
5603	A5
5703	A9
5803	E5
5804	F6
5805	F5
5806	F5
5807	F5
5872	F2
6509	A9
6510	A9
6513	A3
6514	A2
6515	A3
6516	A3
6701	D8
6702	D9
7001	C6
7002	E4
7003	C6
7004	D6
7005	B5
7006	C5
7007	C4
7008	B4
7009	B4
7010	B4
7011	B4
7014	D6
7015	E6
7016	E7
7071	E7
7073	E8
7074	E8
7075	D7
7091	F7
7092	F7
7101	B6
7102	B6
7103	A7
7104	A7
7105	B7
7106	B7
7107	A8
7108	A7
7322	D1
7324	F1
7327	D1
7328	D1
7329	D1
7330	D1
7401	D2
7402	B3
7403	B3
7404	B3
7406	B2
7408	D3
7409	A2
7410	A2
7411	A2
7412	A3
7413	A2
7414	C3
7415	C2
7441	C3
7442	A4
7502	A9
7504	A9
7505	A9
7508	A9
7510	E9
7511	E9
7512	E9
7603	A5
7605	A6
7606	A6
7607	A5
7608	A6
7641	A5
7642	A4
7643	A5
7651	C7
7701	D9
7702	D9
7703	E8
7704	D9
7705	C9
7706	D9
7707	A9
7760	F9
7761	F9
7762	E9
7801	E6
7802	F5
7803	E6
7804	E6
7805	F5
7831	E2
7832	E2
7851	E4
7852	D4
7853	D4
7854	D5
7855	D5
7856	E5
7857	D6
7871	E2
9051	E8
9512	A9
9525	E9
9701	D9

Component Mapping Motherboard

0001	F1
0007	E4
0008	D7
0020	D3
0021	D6
0022	D9
0031	E8
0050	A4
1001	C5
1322	D10
1323	D10
1324	E10
1325	E10
1451	C10
1460	E8
1461	E4
1701	A1
1703	D1
1704	C1
1705	D2
1706	D2
1707	D2
1708	A1
1760	F1
1761	F1
1851	E6
1871	F9
1911	A4
1912	A4
1941	A8
1942	E10
1944	F10
1945	D9
1946	B6
1947	A8
1948	A7
1951	A2
1952	A2
1953	A1
1954	A4
1955	A4
1956	B2
1957	B2
1960	A6
1961	B2
1964	A6
1991	E2
2015	C5
2018	D6
2019	C5
2021	D6
2024	C6
2027	C6
2030	B6
2035	C7
2039	C6
2047	C5
2053	C5
2054	D5
2055	D4
2056	E5
2073	E4
2084	D4
2106	B4
2125	A4
2323	D9
2324	F9
2325	F10
2326	F10
2328	E10
2400	E8
2406	D8
2452	D9
2462	B6
2471	A8
2472	A7
2475	A7
2480	A6
2484	A7
2485	A7
2486	A7
2489	A7
2513	B1
2514	B1
2523	A2
2525	A9
2527	E1
2529	D1
2535	A3
2536	A3
2602	A5
2603	B5
2607	A5
2609	A5
2613	A5
2615	A5
2616	B5
2623	B6
2625	A5
2626	A6
2641	A6
2643	A6
2644	A6
2646	A6
2651	D4
2655	B4
2659	C4
2660	C4
2664	B4
2665	B4
2671	C2
2672	C2
2679	A4
2680	A2
2681	A4
2683	B3
2685	D4
2701	C2
2703	C1
2706	D1
2715	C2
2719	C2
2720	B2
2726	C2
2762	E2
2766	F2
2768	E1
2769	E1
2776	F2
2782	E2
2790	E1
2799	F2
2804	E5
2812	F5
2822	F5
2823	F5
2827	F6
2831	E8
2839	E7
2841	D5
2850	E7
2851	E7
2861	E7
2877	E9
3001	C5
3006	B5
3008	C5
3010	B5
3011	D5
3012	D4
3030	B7
3034	E6
3035	F7
3036	D6
3038	B7
3040	B7
3041	B7
3042	B7
3047	D4
3048	E4
3064	E3
3065	D4
3067	F4
3071	E4
3072	D4
3080	E3
3082	D4
3083	D3
3088	D4
3089	D3
3090	F4
3095	F5
3096	F5
3097	F5
3118	B3
3321	D10
3322	D10
3326	F10
3327	F10
3328	F10
3329	F10
3330	E10
3331	D10
3336	D10
3340	C9
3342	A10
3344	B10
3345	C10
3351	C9
3352	B10
3353	B10
3355	B10
3356	B10
3357	A9
3358	C10
3363	F4
3364	F4
3370	A8
3371	A7
3377	A8
3380	D7
3381	A8
3383	A7
3384	B7
3386	A7
3389	B7
3395	A7
3396	A7
3399	A7
3413	C8
3414	C8
3417	B10
3418	B10
3420	C8
3421	B10
3424	B8
3426	D8
3428	C9
3431	D8
3432	C8
3433	C10
3434	C9
3436	C10
3437	C10
3439	C10
3441	C10
3442	D8
3443	E8
3444	E8
3445	E8
3446	C9
3447	C9
3448	C9
3453	B10
3456	F4
3465	B10
3466	B8
3467	B10
3470	D8
3471	B8
3473	C10
3479	B8
3480	B8
3481	B8
3482	B8
3483	B8
3485	A8
3486	A8
3487	A9
3491	A9
3492	A10
3493	C8
3495	C9
3503	A4
3506	A3
3508	A3
3510	A3
3512	A4
3517	A3
3519	A2
3523	A2
3524	A2
3525	A2
3526	A2
3527	A2
3528	A2
3529	A1
3530	A1
3531	A2
3532	A2
3534	A2
3536	A4
3537	A4
3539	A8
3562	B2
3601	B5
3604	A5
3605	A5
3611	A5
3614	A5
3620	A5
3622	A5
3626	A5
3631	A5
3640	A6
3642	A6
3651	D4
3654	E3
3664	D4
3702	D2
3705	C2
3707	D1
3730	C1
3731	E2
3764	E1
3765	F1
3766	F1
3767	F1
3769	F1
3804	E5
3805	E5
3806	E5
3807	E5
3808	E5
3811	E5
3812	E5
3813	F6
3814	E5
3816	E5
3817	F5
3818	F6
3821	F6
3854	E6
3855	D5
3857	E7
3858	E7
3859	D6
3862	D7
3863	E6
3864	D7
3865	E7
3866	D7
3869	D6
3874	F9
3875	F9
3880	E6
3882	E6
3885	D5
3886	D5
4760	F2
5001	C4
5002	C7
5003	C6
5004	C7
5005	B7
5006	C7
5008	D5
5009	B7
5010	E6
5071	E4
5072	E4
5073	E3
5074	E3
5075	D4
5100	B4
5101	B4
5322	E10
5323	F10
5451	C8
5452	A9
5453	C10
5454	C9
5471	A7
5501	B1
5601	B5
5602	A5
5641	A6
5701	D2
5702	D2
5704	C1
5705	C1
5706	D1
5707	C1
5708	C1
5760	D1
5761	D1
5762	F1
5801	E5
5802	F6
5851	E7
5852	E6
5853	E7
5854	D6
5856	D6
5871	E9
6401	B8
6404	A9
6405	A8
6460	D6
6502	A2
6503	A2
6504	A2
6505	A2
6506	A2
6507	A2
6508	A2
6601	A5
6761	E1
7072	E4
7321	D10
7323	D10
7325	F10
7326	F10
7407	D8
7440	A8
7443	B7
7446	A7
7451	A10
7452	A9
7461	D3
7462	D9
7464	E7
7465	E4
7466	D7
7506	A1
7509	A9
7604	A5
7807	F6
7830	E9
9011	E1
9012	B3
9013	B4
9014	B4
9015	B4
9016	B4
9017	B4
9018	B5
9019	A5
9021	B5
9022	A4
9023	C4
9024	C4
9025	C4
9061	E3
9062	E3
9063	B4
9064	D3
9065	D3
9066	D3
9067	D4
9068	D4
9069	B4
9070	D4
9072	C5
9073	C5
9074	D5
9075	D5
9076	E6
9077	C6
9078	C6
9079	D6
9080	C6
9081	C6
9082	D7
9083	C7
9084	D5
9085	D5
9086	D5
9087	D5
9088	E4
9089	D6
9090	D6
9091	E4
9092	D5
9094	D6
9095	C7
9097	D6
9098	E6
9099	D4
9100	B4
9152	C7
9153	C7
9154	C5
9155	D7
9158	D7
9160	C6
9301	B9
9403	A4
9404	A9
9411	A8
9414	A8
9415	B9
9416	A10
9417	A10
9418	A10
9419	A9
9421	E8
9422	A9
9423	A9
9424	A9
9425	B9
9426	B9
9427	B9
9428	B9
9429	B8
9430	B10
9431	B10
9432	B10
9433	A10
9435	C9
9436	C10
9437	C10
9438	C9
9439	C10
9440	D9
9441	D9
9442	D9
9445	C8
9446	C8
9447	C8
9448	C8
9449	C7
9450	C8
9452	D8
9453	D8
9454	B8
9455	B7
9456	B7
9457	B8
9458	B7
9459	A8
9460	B8
9462	A8
9463	A8
9464	A7
9465	A7
9466	B8
9467	A7
9468	A7
9469	A7
9470	A7
9471	A7
9472	A6
9473	A8
9474	A8
9475	A8
9476	A8
9477	A7
9478	A8
9479	A8
9480	A8
9481	A8
9483	A7
9484	A8
9485	A8
9486	B7
9487	C7
9488	C7
9489	C7
9490	C7
9495	D7
9496	E10
9497	F10
9498	A8
9500	D1
9511	A1
9513	A1
9514	A3
9515	A3
9516	A3
9517	A2
9518	A2
9519	A2
9521	B2
9523	B1
9524	B2
9601	A5
9604	A6
9611	A4
9612	A5
9613	B5
9614	A5
9621	C3
9622	A3
9623	A3
9624	F1
9625	B2
9626	C3
9627	C3
9631	B3
9632	B3
9633	C4
9634	B3
9636	B5
9637	A5
9638	A5
9639	A5
9640	B5
9641	B5
9642	C4
9643	B4
9644	D3
9645	D3
9646	D3
9647	D3
9648	D4
9649	D4
9650	C3
9651	B3
9652	C3
9653	C2
9654	C3
9655	C3
9656	C3
9657	C3
9702	D2
9711	B1
9712	C1
9713	C3
9714	C2
9715	C2
9716	D1
9717	F2
9718	D1
9719	C1
9720	E1
9721	D2
9722	D2
9723	F2
9724	D1
9725	E2
9726	E1
9727	D1
9728	B2
9729	F3
9730	A1
9731	F3
9732	F3
9733	F3
9734	F3
9735	F3
9736	F4
9737	F4
9739	F3
9741	F2
9742	C2
9743	D1
9744	E2
9745	F3
9746	E2
9747	E2
9748	E3
9749	E3
9750	E3
9752	E2
9753	D3
9754	E3
9755	E2
9756	D1
9757	E1
9758	E2
9759	F4
9760	E3
9761	F1
9762	E1
9763	F2
9764	D2
9813	F5
9814	F4
9815	F4
9816	F5
9817	F6
9818	F4
9820	B2
9822	E8
9823	F7
9824	F8
9825	F7
9826	F7
9829	F7
9830	D6
9831	F7
9832	D6
9833	F6
9835	F7
9836	F7
9837	E6
9838	E7
9839	E6
9840	F5
9902	F9
9903	F9
9904	F9
9905	D7
9907	D10
9908	E10
9909	E10
9922	D8
9923	D7
9924	D7
9925	E6
9926	D7
9927	D7
9929	D7
9932	D9
9933	D9
9934	F10
9935	F9
9936	F8
9937	E8
9938	D8
9939	D8
9940	F7
9941	D9
9942	F9
9943	D10
9944	D10
9945	F10
9946	D10
9947	F10
9948	D10
9949	D10
9950	E10
9951	E10
9952	D9
9953	D9
9956	E8
9958	D8
9960	E8
9962	A7
9963	D6
9965	F7

Motherboard (MOBO)



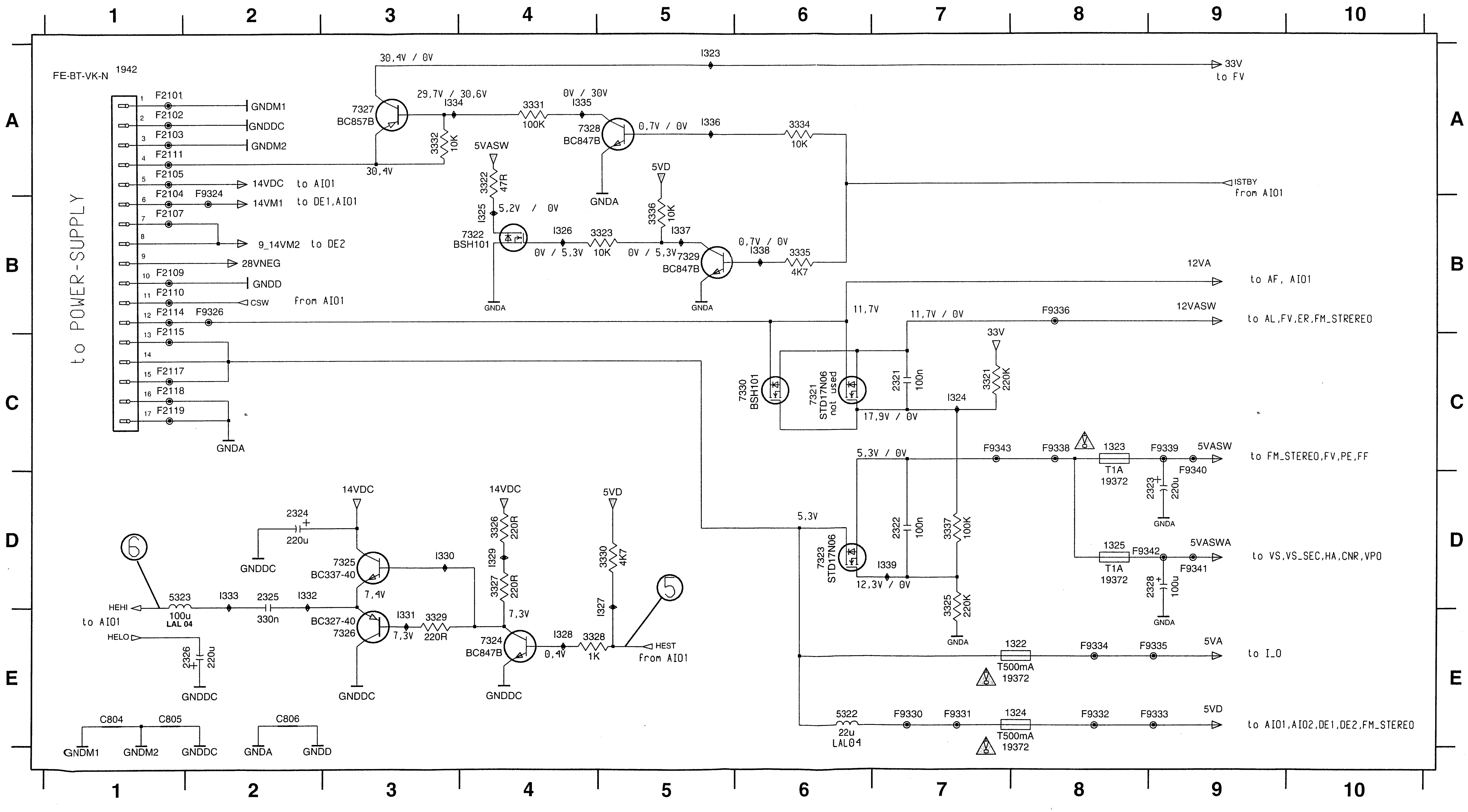
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
1951
1952
1954
1955
1941
1946
1948
1944
1942
1945
1703
1704
1707
1708
1706
1705
1461
1460
1451
1851
1871
1761
1760
7446
7443
7451
7452
7440
7072
7807
7830
7465
7464
7466
7506
0050
0001
0031
0007
0008
0020
0021
0022
5101
5001
5601
5602
5641
3118

Supply Part (PS)

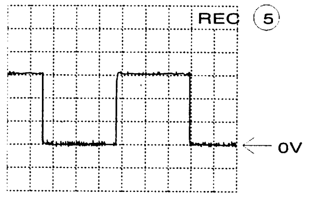
Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	3-42

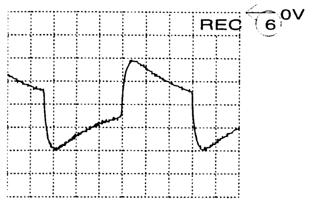
1323 C8	2321 C7	2325 D2	3322 A4	3327 D4	3331 A4	3336 B5	7321 C6	7325 D3	7329 B5	C806 E2	F2104 B1	F2110 B1	F2117 C1	F9326 B2	F9333 E9	F9338 C8	F9342 D8	I325 B4	I329 D4	I333 D2	I337 B5
1324 E8	2322 D7	2326 E2	3323 B5	3328 E4	3332 A3	3337 D7	7322 B4	7326 E3	7330 C6	F2101 A1	F2105 A1	F2111 A1	F2118 C1	F9330 E7	F9334 E8	F9339 C9	F9343 C7	I326 B4	I330 D3	I334 A3	I338 B6
1325 D8	2323 D9	2328 D9	3325 D7	3329 E3	3334 A6	5322 E6	7323 D6	7327 A3	C804 E1	F2102 A1	F2107 B1	F2114 B1	F2119 C1	F9331 E7	F9335 E9	F9340 D9	I323 A5	I327 D5	I331 E3	I335 A4	I339 D7


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
FE-BT-VK-N
1942
to POWER-SUPPLY
F2101
GNDM1
F2102
GNDDC
F2103
GNDM2
F2111
F2105
14VDC to AIO1
F2104
F9324
14VM1 to DE1,AIO1
F2107
9_14VM2 to DE2
28VNEG
F2109
GNDD
F2110
CSW from AIO1
F2114
F9326
F2115
F2117
F2118
F2119
GNDA
30,4V / 0V
I323
33V to FV
7327 BC857B
29,7V / 30,6V
I334
3332 10K
30,4V
3331 100K
0V / 30V
I335
7328 BC847B
0,7V / 0V
I336
3334 10K
GNDA
5VASW
3322 47R
I325
5,2V / 0V
7322 BSH101
I326
3323 10K
0V / 5,3V
0V / 5,3V
5VD
3336 10K
I337
7329 BC847B
0,7V / 0V
I338
3335 4K7
ISTBY from AIO1
12VA to AF, AIO1
11,7V
11,7V / 0V
F9336
12VASW to AL,FV,ER,FM_STRERED
33V
7330 BSH101
7321 STD17N06 not used
2321 100n
3321 220K
I324
17,9V / 0V
5,3V / 0V
F9343
F9338
1323 T1A 19372
F9339
5VASW
F9340
to FM_STEREO,FV,PE,FF
2323 220u
5,3V
7323 STD17N06
I339
12,3V / 0V
2322 100n
3337 100K
3325 220K
1325 T1A 19372
F9342
5VASWA
F9341
to VS,VS_SEC,HA,CNR,VPO
2328 100u
1322 T500mA 19372
F9334
F9335
5VA to I_O
5322 22u LAL04
F9330
F9331
1324 T500mA 19372
F9332
F9333
5VD to AIO1,AIO2,DE1,DE2,FM_STEREO
14VDC
2324 220u
GNDDC
7325 BC337-40
I330
7,4V
6
HEHI to AIO1
HELO
5323 100u LAL 04
I333
2325 330n
I332
7326 BC327-40
I331
3329 220R
7,3V
2326 220u
14VDC
3326 220R
I329
3327 220R
7,3V
7324 BC847B
I328
3328 1K
0,4V
5VD
3330 4K7
I327
5
HEST from AIO1
C804
C805
C806
GNDM1
GNDM2
GNDDC
GNDA
GNDD

Oscillograms Supply Part



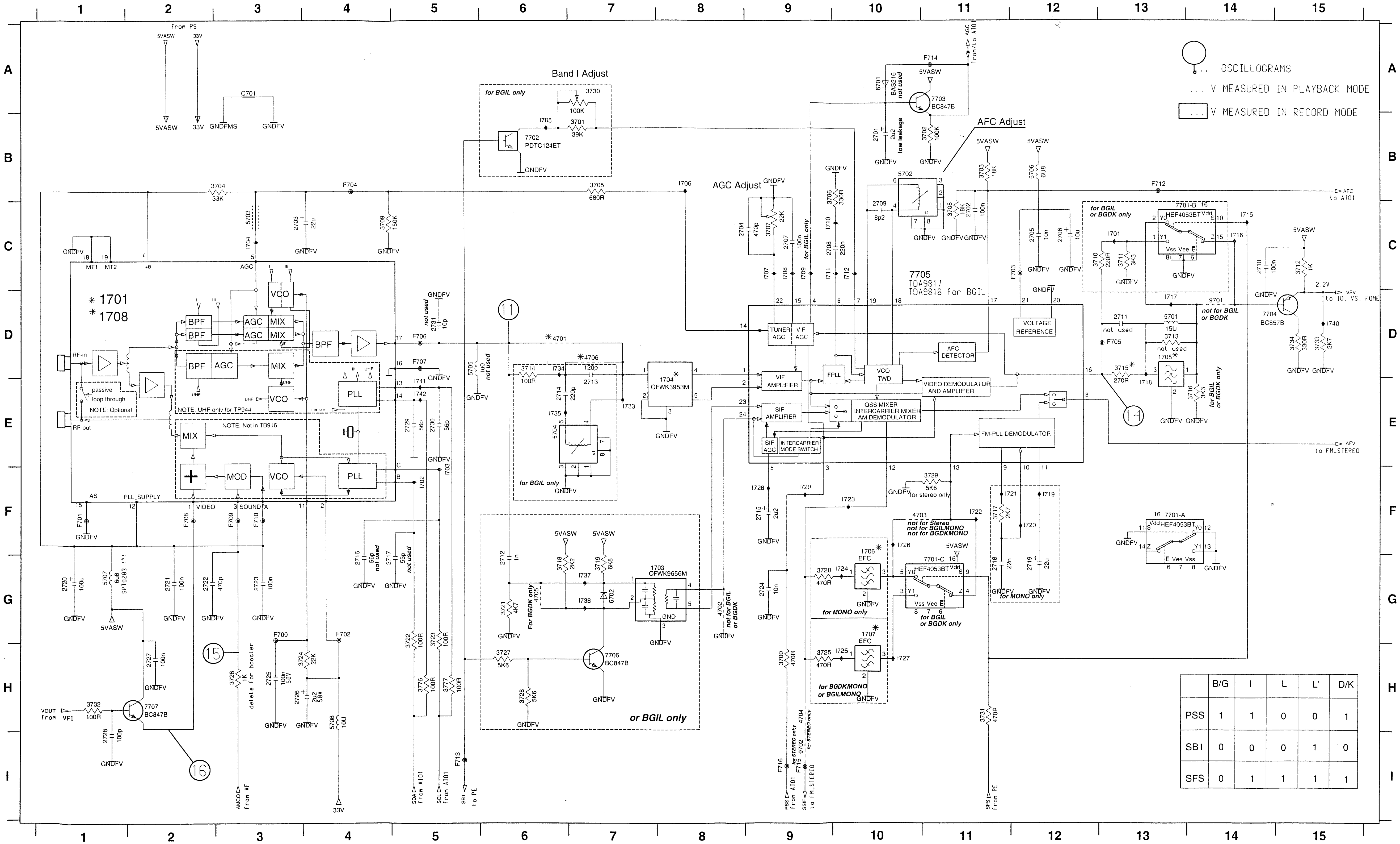
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13



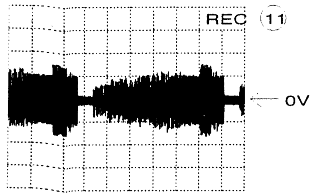
A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5

Frontend (FV)

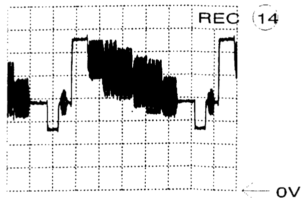
1701 E1
1703 G7
1704 E8
1705 D13
1706 F10
1707 G10
2701 B10
2702 C11
2703 C3
2704 C8
2705 C12
2706 C12
2707 C9
2708 C9
2709 C10
2710 C14
2711 D13
2712 G6
2713 E7
2714 E6
2715 F9
2716 G4
2717 G4
2718 G11
2719 G12
2720 G1
2721 G2
2722 G2
2723 G3
2724 G9
2725 H3
2726 H3
2727 H2
2728 I1
2729 E5
2730 E5
3700 H9
3701 B7
3702 B11
3703 B11
3704 B3
3705 B7
3706 B9
3707 C9
3708 C11
3709 C4
3710 C12
3711 C13
3712 C15
3713 D13
3714 D6
3715 D13
3716 E14
3717 F11
3718 G6
3719 G7
3720 G9
3721 G6
3722 G5
3723 G5
3724 H3
3725 H9
3726 H3
3727 H6
3728 H6
3729 F11
3730 A7
3731 H11
3732 H1
3733 D15
3734 D15
3776 H5
3777 H5
4701 D6
4702 G8
4703 F10
4704 H9
4705 G6
5701 D13
5702 B10
5703 C3
5704 E6
5705 D5
5706 B12
5707 G1
5708 H4
6701 A10
6702 G7
7701-A F13
7701-B C13
7701-C G11
7702 B6
7703 A11
7704 D14
7705 C10
7706 H7
7707 H2
9701 D14
9702 I9
C701 A3
F700 G3
F701 F1
F702 G4
F703 C12
F704 B4
F705 D13
F706 D5
F707 D5
F708 F2
F709 F3
F710 F3
F712 B13
F713 I5
F714 A11
F715 I9
F716 I9
I701 C13
I702 F5
I703 F5
I704 C3
I705 B6
I706 B8
I707 C9
I708 C9
I709 C9
I710 C9
I711 C9
I712 C10
I715 C14
I716 C14
I717 D13
I718 E13
I719 F12
I720 F12
I721 F11
I722 F11
I723 F10
I724 G10
I725 H10
I726 F10
I727 H10
I728 F9
I729 F9
I733 E7
I734 D6
I735 E6
I737 G7
I738 G7
I740 D15
I741 E5
I742 E5


from PS
5VASW
33V
C701
GNDFMS
GNDFV
Band I Adjust
for BGIL only
3730
100K
3701
39K
I705
7702
PDTC124ET
3704
33K
F704
3705
680R
I706
AGC Adjust
AFC Adjust
5702
7703
BC847B
BAS216
not used
6701
F714
low leakage
AGC
from/to AI01
AFC
to AI01
F712
1701
1708
RF-in
RF-out
passive loop through
NOTE: Optional
BPF
AGC
MIX
VCO
PLL
MOD
NOTE: UHF only for TP944
NOTE: Not in TB916
MT1
MT2
AS
PLL SUPPLY
VIDEO
SOUNDTA
4701
4706
1704
OFWK3953M
1703
OFWK9656M
5704
for BGIL only
7706
BC847B
or BGIL only
For BGDK only
not for BGIL or BGDK
7705
TDA9817
TDA9818 for BGIL
TUNER AGC
VIF AGC
VIF AMPLIFIER
SIF AMPLIFIER
SIF AGC
INTERCARRIER MODE SWITCH
FPLL
VCO TWD
AFC DETECTOR
VIDEO DEMODULATOR AND AMPLIFIER
QSS MIXER INTERCARRIER MIXER AM DEMODULATOR
FM-PLL DEMODULATOR
VOLTAGE REFERENCE
for BGIL or BGDK only
7701-B
HEF4053BT
7701-A
HEF4053BT
7701-C
HEF4053BT
1706 EFC
1707 EFC
for MONO only
for BGDKMONO or BGILMONO
for BGIL or BGDK only
not for Stereo not for BGILMONO not for BGDKMONO
for stereo only
7704
BC857B
VFV
to IO, VS, FOME
AFV
to FM_STEREO
9701
not for BGIL or BGDK
1705
for BGIL or BGDK only
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
7707
BC847B
VOUT from VPO
delete for booster
AMCO from AF
SDA from AI01
SCL from AI01
SB1 to PE
PSS from AI01
SSF to FM_STEREO
SFS from PE
33V
11
14
15
16

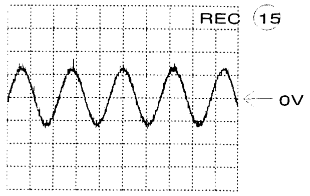
	B/G	I	L	L'	D/K
PSS	1	1	0	0	1
SB1	0	0	0	1	0
SFS	0	1	1	1	1



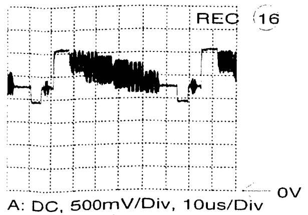
A: DC, 200mV/Div, 10us/Div
Tuner Pin 17



A: DC, 500mV/Div, 10us/Div
IC 7705 Pin 8



A: DC, 500mV/Div, 500us/Div
Tumod Pin 3



A: DC, 500mV/Div, 10us/Div
Tumod Pin 1

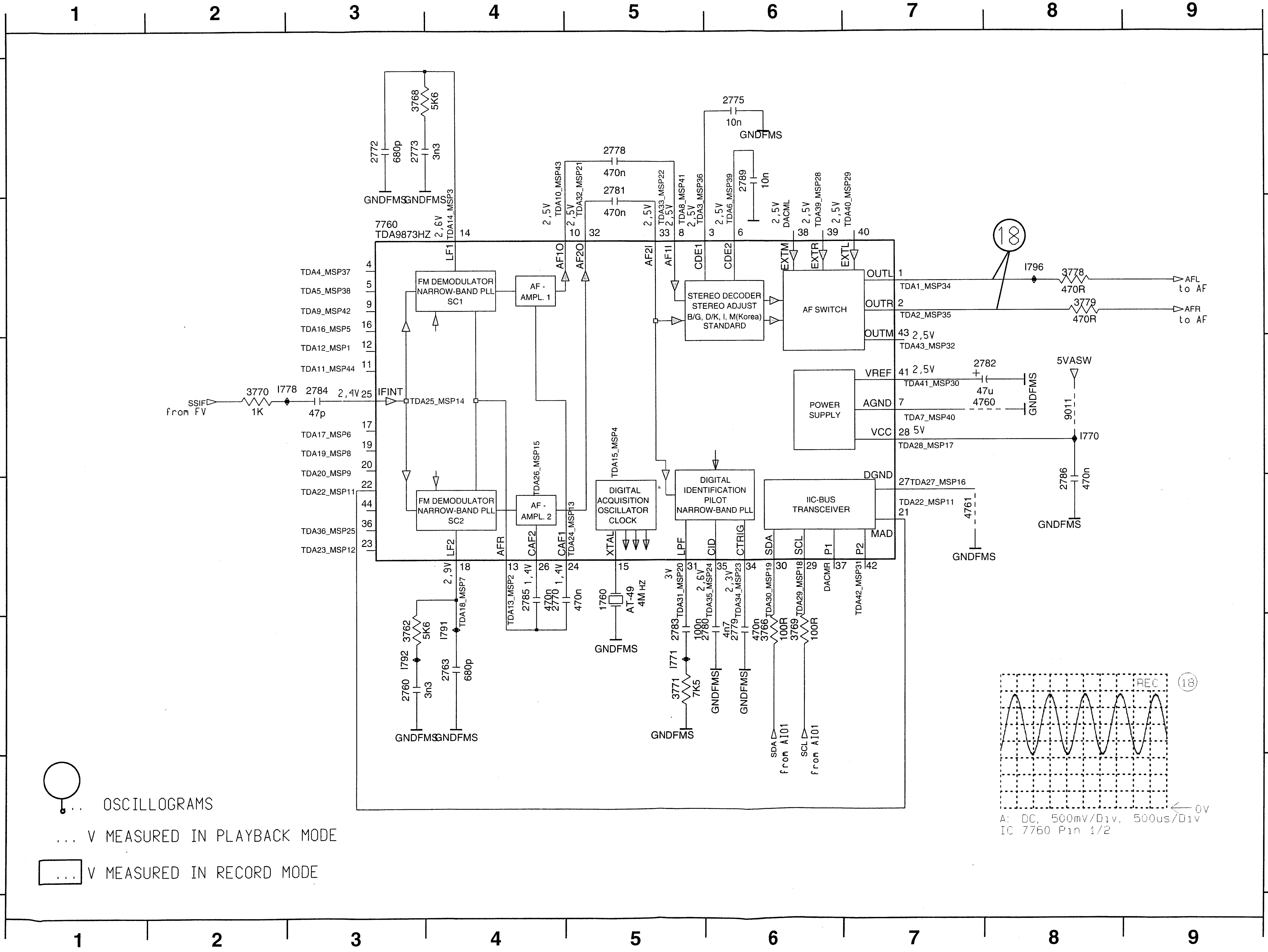
Variant List Frontend

	PAL BG	PAL BG	PAL I Fullband	PAL,SEC BG/DK	PAL, SEC BG/I/DK, L/L'	
	/02	/13, /16	/07	/58	/39	
Pos.	FM QSS	FM, NICAM QSS	FM, NICAM QSS	NICAM QSS	FM, AM, NICAM QSS	**FUNKTION**
1708	TP916L MKII	TP916L MKII	-	-	TP926L MKII	TUMOD PHILIPS
1701	TCBZ4-001A/B	TCBZ4-001A/B	TCBZ4-001A/B	TCBZ4-001A/B	TCBZ4-003A/B	TUMOD ALPS MK3
1703	K9656M	K9656M	K9656M	K9656M	K9656M	QSS Sound OFW
1704	G3956M	G3956M	K3953M	G3956M	K3953M	QSS Video OFW
1705	TPS 5,5	TPS 5,5	TPS 6,0	TPS 5,5	TPS 5,5	Video-TRAP
1706	-	-	-	-	-	1. Sound-Filter
1707	-	-	-	-	-	2. Sound-Filter
2707	-	-	-	-	100n	VIF AGC TDA 9818T only
2712	1n	1n	1n	1n	1n	QSS Sound OFW Kopplung
2713	-	-	-	-	120p	40,4 Falle
2714	-	-	-	-	220p	40,4 Falle
2718	-	-	-	-	-	Deemphasis MONO
2719	-	-	-	-	-	FM PLL Demodulator
2722	470p	470p	470p	470p	-	Siebung Audio Modul. IN
3701	-	-	-	-	39K	SEC Band 1 Adj.
3710	-	-	-	220E	220E	Video Trap Bypass
3711	-	-	-	3k3	3k3	Video-Amplitude Multistdt.
3714	-	-	-	-	100E	40,4 Falle
3715	330E	330E	330E	330E	270E	Video Trap Vorwiderstand
3716	-	-	-	2k2	2k2	Video Trap Abschluß
3717	-	-	-	-	-	Deemphasis MONO
3718	-	-	-	-	2k2	Sound OFW Umsch.
3719	-	-	-	-	6k8	Sound OFW Umsch.
3720	-	-	-	-	-	EFC Vorwiderstand
3721	-	-	-	-	4k7	Sound OFW Umsch.
3725	-	-	-	-	-	2. EFC Vorwiderstand
3726	1k	1k	1k	1k	-	Audio IN Modulator
3727	-	-	-	-	5k6	Sound OFW Umsch.
3728	-	-	-	-	5k6	Sound OFW Umsch.
3729	5k6	5k6	5k6	5k6	5k6	Mute FM Demodulator
3730	-	-	-	-	100K	SEC Band 1 Adj.
4701	0E	0E	0E	0E	-	40,4 Falle Bypass
4702	-	-	-	-	-	Intercarier switch
4703	-	-	-	-	-	4053 Bypass
4704	0E	0E	0E	0E	0E	SIF zu MSP/TDA
4705	0E	0E	0E	0E	-	QSS OFW BG/DK/I Select.
4706	0E	0E	0E	0E	-	Meßpunktverbindung
5701	15uH	15uH	15uH	15uH	15uH	Video Trap Spule
5704	-	-	-	-	41645	40,4 Falle
6702	-	-	-	-	BA792	Sound OFW Umsch.
7701	-	-	-	HEF4053	HEF4053	EFC / TRAP switch
7702	-	-	-	-	PDTC124EU	AFC L'
7705	TDA 9817 T	TDA 9817 T	TDA 9817 T	TDA 9817 T	TDA 9818 T	AV Demodulator
7706	-	-	-	-	BC847BW	Sound OFW Umsch.
9701	0E	0E	0E	-	-	4053 Bypass
9702	0E	0E	0E	0E	0E	SIF zu MSP/TDA

Stereo Decoder (FM-STEREO-TDA)

Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	



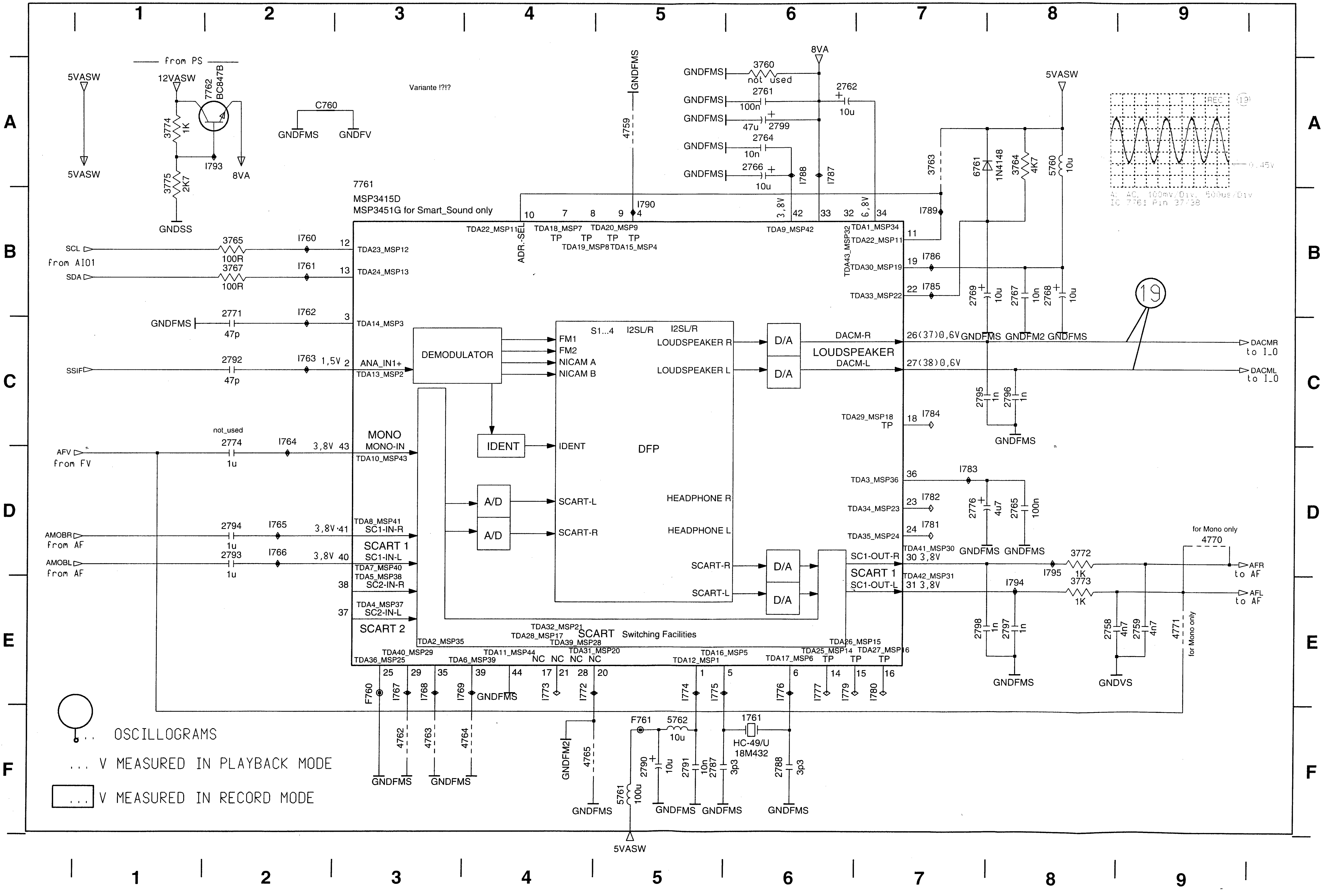
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
7760
TDA9873HZ
FM DEMODULATOR NARROW-BAND PLL SC1
FM DEMODULATOR NARROW-BAND PLL SC2
AF - AMPL. 1
AF - AMPL. 2
STEREO DECODER STEREO ADJUST B/G, D/K, I, M(Korea) STANDARD
AF SWITCH
POWER SUPPLY
DIGITAL ACQUISITION OSCILLATOR CLOCK
DIGITAL IDENTIFICATION PILOT NARROW-BAND PLL
IIC-BUS TRANSCEIVER
LF1
LF2
AF1O
AF2O
AF2I
AF1I
CDE1
CDE2
EXTM
EXTR
EXTL
OUTL
OUTR
OUTM
VREF
AGND
VCC
DGND
MAD
IFINT
AFR
CAF2
CAF1
XTAL
LPF
CID
CTRIG
SDA
SCL
P1
P2
DACML
DACMR
TDA4_MSP37
TDA5_MSP38
TDA9_MSP42
TDA16_MSP5
TDA12_MSP1
TDA11_MSP44
TDA17_MSP6
TDA19_MSP8
TDA20_MSP9
TDA22_MSP11
TDA36_MSP25
TDA23_MSP12
TDA25_MSP14
TDA14_MSP3
TDA10_MSP43
TDA32_MSP21
TDA33_MSP22
TDA8_MSP41
TDA3_MSP36
TDA6_MSP39
TDA39_MSP28
TDA40_MSP29
TDA1_MSP34
TDA2_MSP35
TDA43_MSP32
TDA41_MSP30
TDA7_MSP40
TDA28_MSP17
TDA27_MSP16
TDA22_MSP11
TDA18_MSP7
TDA13_MSP2
TDA26_MSP15
TDA24_MSP13
TDA15_MSP4
TDA31_MSP20
TDA35_MSP24
TDA34_MSP23
TDA30_MSP19
TDA29_MSP18
TDA42_MSP31
SSIF from FV
3770 1K
I778
2784 47p
2,4V
3768 5K6
2772 680p
2773 3n3
GNDFMS
2,6V
2778 470n
2781 470n
2,5V
2775 10n
2789 10n
I796
3778 470R
3779 470R
AFL to AF
AFR to AF
2782 47u
4760
5VASW
9011
I770
2786 470n
4761
5V
2,9V
3762 5K6
I792
2760 3n3
I791
2763 680p
2785 470n
2770 470n
1,4V
1760 AT-49 4M HZ
3V
2783 100n
2780 4n7
2779 470n
2,6V
2,3V
I771
3771 7K5
3766 100R
3769 100R
SDA from AIO1
SCL from AIO1
18
REC
A: DC, 500mV/Div, 500us/Div
IC 7760 Pin 1/2
0V
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE

1760	D5
2760	E3
2763	E4
2770	D4
2772	A3
2773	A3
2775	A6
2778	A5
2779	E6
2780	E6
2781	A5
2782	C7
2783	E5
2784	C3
2785	D4
2786	D8
2789	A6
3762	E3
3766	E6
3768	A3
3769	E6
3770	C2
3771	E5
3778	B8
3779	B8
4760	C7
4761	D7
7760	B3
9011	C8
I770	C8
I771	E5
I778	C2
I791	E4
I792	E3
I796	B8

Stereo Decoder (FM-STEREO-MSP)

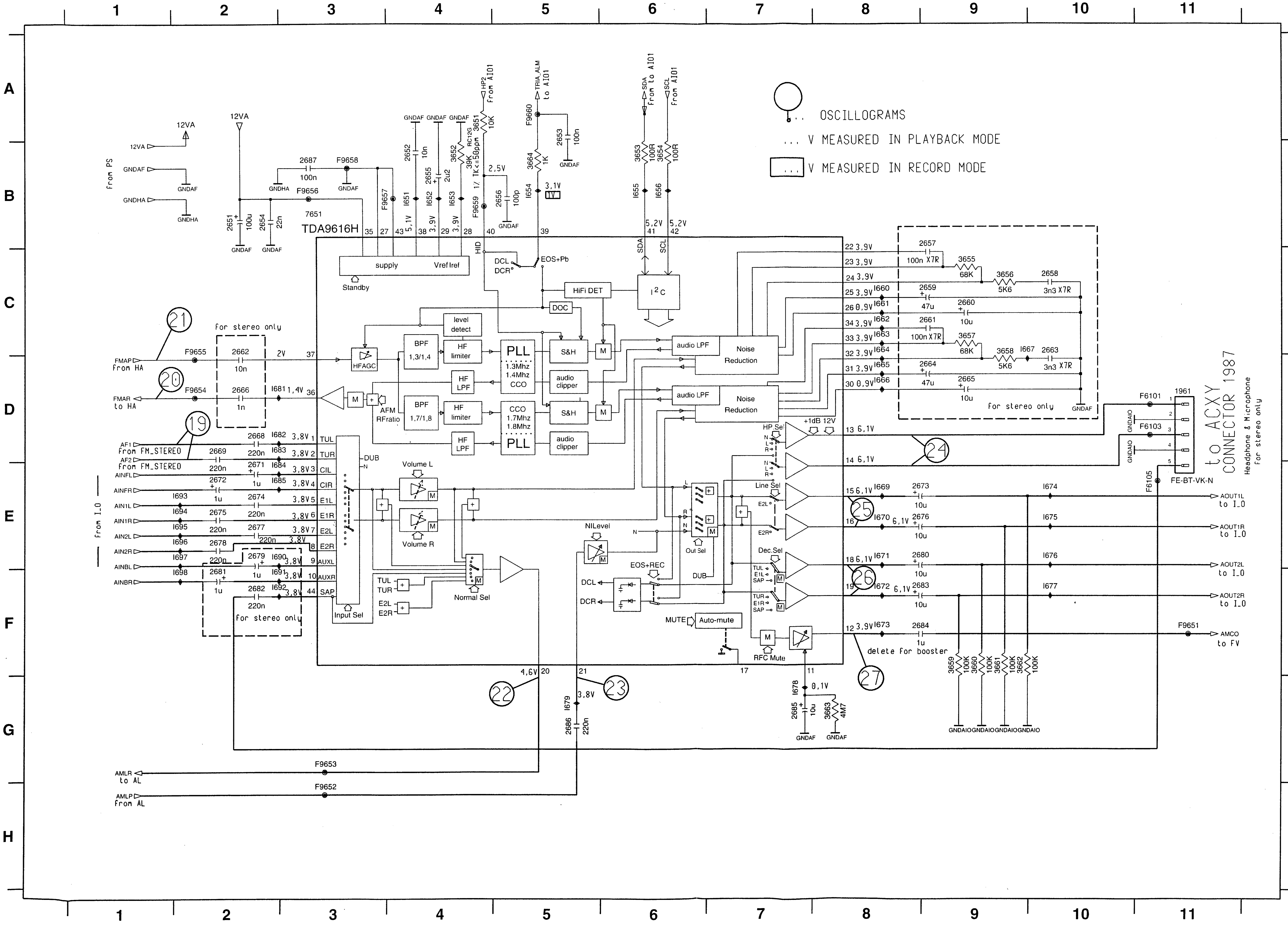
Interconnections — Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	


1 2 3 4 5 6 7 8 9
A B C D E F
from PS
5VASW
12VASW
7762 BC847B
3774 1K
3775 2K7
I793
8VA
GNDSS
C760
GNDFMS
GNDFV
Variante !?!?
7761
MSP3415D
MSP3451G for Smart_Sound only
GNDFMS
4759
I790
8VA
3760 not used
2761 100n
2799 47u
2764 10n
2766 10u
2762 10u
I788
I787
3,8V
6,8V
5VASW
3763
6761 1N4148
3764 4K7
5760 10u
I789
REC
AC 100mV/Div. 500us/Div
IC 7761 Pin 37/38
0,45V
SCL
SDA
from AIO1
3765 100R
3767 100R
I760
I761
2771 47p
I762
SSIF
2792 47p
I763
1,5V
AFV
from FV
not_used
2774 1u
I764
3,8V
AMOBR
from AF
2794 1u
I765
AMOBL
from AF
2793 1u
I766
3,8V
TDA22_MSP11
ADR.-SEL
TDA18_MSP7
TDA20_MSP9
TP TP TP TP
TDA19_MSP8
TDA15_MSP4
TDA9_MSP42
TDA43_MSP32
TDA1_MSP34
TDA22_MSP11
TDA23_MSP12
TDA24_MSP13
TDA14_MSP3
ANA_IN1+
TDA13_MSP2
DEMODULATOR
FM1
FM2
NICAM A
NICAM B
S1...4
I2SL/R
LOUDSPEAKER R
LOUDSPEAKER L
D/A
DACM-R
LOUDSPEAKER
DACM-L
IDENT
DFP
MONO
MONO-IN
TDA10_MSP43
A/D
SCART-L
SCART-R
HEADPHONE R
HEADPHONE L
SCART-R
SCART-L
TDA8_MSP41
SC1-IN-R
SCART 1
SC1-IN-L
TDA7_MSP40
TDA5_MSP38
SC2-IN-R
TDA4_MSP37
SC2-IN-L
SCART 2
TDA2_MSP35
TDA32_MSP21
TDA28_MSP17
TDA39_MSP28
SCART Switching Facilities
TDA40_MSP29
TDA36_MSP25
TDA6_MSP39
TDA11_MSP44
TDA31_MSP20
NC NC NC NC
TDA16_MSP5
TDA12_MSP1
TDA17_MSP6
TDA26_MSP15
TDA25_MSP14
TDA27_MSP16
TDA30_MSP19
TDA33_MSP22
I786
I785
TDA29_MSP18
I784
TDA3_MSP36
TDA34_MSP23
TDA35_MSP24
I783
I782
I781
TDA41_MSP30
TDA42_MSP31
SC1-OUT-R
SC1-OUT-L
30 3,8V
31 3,8V
26(37)0,6V
27(38)0,6V
2769 10u
2767 10n
2768 10u
19
GNDFMS GNDFM2 GNDFMS
DACMR to I_O
DACML to I_O
2795 1n
2796 1n
2776 4u7
2765 100n
I795
3772 1K
3773 1K
I794
for Mono only
4770
AFR to AF
AFL to AF
2798 1n
2797 1n
2758 4n7
2759 4n7
4771 for Mono only
GNDVS
F760
I767
I768
I769
I772
I773
I774
I775
I776
I777
I779
I780
4762
4763
4764
4765
GNDFM2
F761
5762 10u
1761 HC-49/U 18M432
2790 10u
2791 10n
2787 3p3
2788 3p3
5761 100u
5VASW
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE

1761	F6
2758	E8
2759	E9
2761	A6
2762	A6
2764	A6
2765	D8
2766	A6
2767	B8
2768	B8
2769	B7
2771	B2
2774	C2
2776	D7
2787	F5
2788	F6
2790	F5
2791	F5
2792	C2
2793	D2
2794	D2
2795	C7
2796	C8
2797	E8
2798	E7
2799	A6
3760	A6
3763	A7
3764	A8
3765	B2
3767	B2
3772	D8
3773	E8
3774	A1
3775	A1
4759	A5
4762	F3
4763	F3
4764	F4
4765	F4
4770	D9
4771	E9
5760	A8
5761	F5
5762	F5
6761	A7
7761	B3
7762	A2
C760	A2
F760	E3
F761	F5
I760	B2
I761	B2
I762	B2
I763	C2
I764	C2
I765	D2
I766	D2
I767	E3
I768	E3
I769	E3
I772	E4
I773	E4
I774	E5
I775	E5
I776	E6
I777	E6
I779	E6
I780	E7
I781	D7
I782	D7
I783	D7
I784	C7
I785	B7
I786	B7
I787	A6
I788	A6
I789	B7
I790	B5
I793	A2
I794	E8
I795	D8

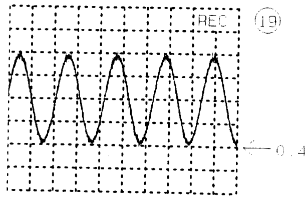
FM Audio (AF)



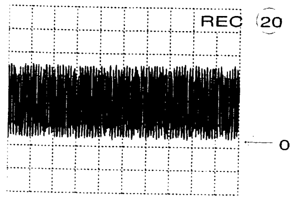
1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
from PS
12VA
GNDAF
GNDHA
2651 100u
2654 22n
2687 100n
F9658
F9656
7651
TDA9616H
supply
Vref Iref
Standby
HP2 from AI01
3651 10K
3652 39K RC12G
1/ Tk=50ppm
F9659
2,5V
2656 100p
2652 10n
2655 2u2
F9657
I651 5,1V
I652 3,9V
I653 3,9V
TRIA_ALM to AI01
F9660
3664 1K
2653 100n
I654 3,1V
SDA from to AI01
SCL from AI01
3653 100R
3654 100R
I655 5,2V
I656 5,2V
HID
DCL
DCR°
EOS+Pb
HiFi DET
I²C
DOC
level detect
HFAGC
BPF 1,3/1,4
BPF 1,7/1,8
HF limiter
HF LPF
PLL
1.3Mhz 1.4Mhz CCO
CCO 1.7Mhz 1.8Mhz
S&H
audio clipper
audio LPF
Noise Reduction
AFM RFratio
M
FMAP from HA
F9655
2662 10n
2V
For stereo only
FMAR to HA
F9654
2666 1n
I681 1,4V
AF1 from FM_STEREO
AF2 from FM_STEREO
AINFL
AINFR
AIN1L
AIN1R
AIN2L
AIN2R
AINBL
AINBR
from I.O
2668 220n
2669 220n
2671 220n
2672 1u
2674 220n
2675 220n
2677 220n
2678 220n
2679 1u
2681 1u
2682 220n
I682 I683 I684 I685 I690 I691 I692
I693 I694 I695 I696 I697 I698
3,8V
TUL TUR CIL CIR E1L E1R E2L E2R AUXL AUXR SAP
Input Sel
DUB
Volume L
Volume R
Normal Sel
TUL TUR E2L E2R
NILevel
EOS+REC
DCL DCR
MUTE
Auto-mute
RFC Mute
HP Sel
Line Sel
Out Sel
Dec.Sel
+1dB 12V
22 3,9V
23 3,9V
24 3,9V
25 3,9V I660
26 0,9V I661
34 3,9V I662
33 3,9V I663
32 3,9V I664
31 3,9V I665
30 0,9V I666
2657 100n X7R
3655 68K
3656 5K6
2658 3n3 X7R
2659 47u
2660 10u
2661 100n X7R
3657 68K
3658 5K6
I667
2663 3n3 X7R
2664 47u
2665 10u
GNDAF
13 6,1V
14 6,1V
15 6,1V I669
16 I670 6,1V
18 6,1V I671
19 I672 6,1V
12 3,9V I673
2673 10u
2676 10u
2680 10u
2683 10u
2684 1u
delete for booster
I674 I675 I676 I677
AOUT1L to I.O
AOUT1R to I.O
AOUT2L to I.O
AOUT2R to I.O
F9651
AMCO to FV
3659 100K
3660 100K
3661 100K
3662 100K
GNDAIO
F6101
F6103
F6105
1961
FE-BT-VK-N
to ACXY CONNECTOR 1987
Headphone & Microphone for stereo only
4,6V 20
21 3,8V
17
11
I678 0,1V
2685 10u
3663 4M7
I679
2686 220n
AMLR to AL
F9653
AMLP from AL
F9652

1961	D11
2651	B2
2652	B4
2653	A5
2654	B2
2655	B4
2656	B5
2657	B9
2658	C10
2659	C9
2660	C9
2661	C9
2662	C2
2663	C10
2664	D9
2665	D9
2666	D2
2668	D2
2669	D2
2671	E2
2672	E2
2673	E8
2674	E2
2675	E2
2676	E8
2677	E2
2678	E2
2679	E2
2680	E8
2681	F2
2682	F2
2683	F8
2684	F8
2685	G7
2686	G5
2687	B3
3651	A4
3652	B4
3653	B6
3654	B6
3655	C9
3656	C9
3657	C9
3658	C9
3659	F9
3660	F9
3661	F9
3662	F9
3663	G8
3664	B5
7651	B3
F6101	D11
F6103	D11
F6105	E11
F9651	F11
F9652	H3
F9653	G3
F9654	D2
F9655	C2
F9656	B3
F9657	B4
F9658	B3
F9659	B4
F9660	A5
I651	B4
I652	B4
I653	B4
I654	B5
I655	B6
I656	B6
I660	C8
I661	C8
I662	C8
I663	C8
I664	C8
I665	D8
I666	D8
I667	C9
I669	E8
I670	E8
I671	E8
I672	F8
I673	F8
I674	E10
I675	E10
I676	E10
I677	F10
I678	G7
I679	G5
I681	D2
I682	D2
I683	D2
I684	E2
I685	E2
I690	E2
I691	F2
I692	F2
I693	E
I694	E
I695	E
I696	E
I697	E
I698	F2

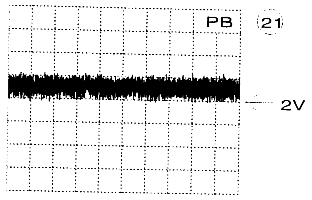
Oscillograms FM Audio, Erase Oscillator



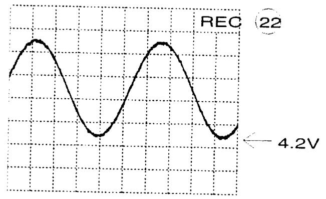
A: AC, 100mV/Div, 500us/Div
IC 7761 Pin 37/38



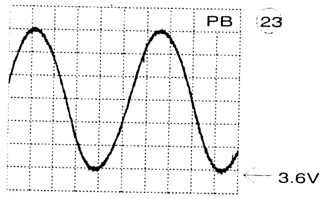
A: DC, 200mV/Div, 5ms/Div
FMAR



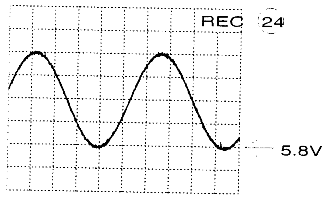
A: AC, 200mV/Div, 500us/Div
FMAP



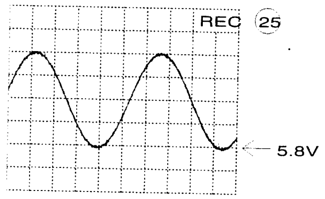
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 20



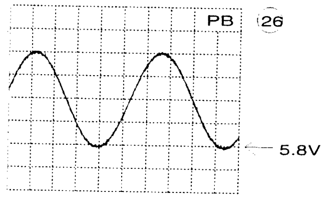
A: AC, 100mV/Div, 200us/Div
IC 7651 Pin 21



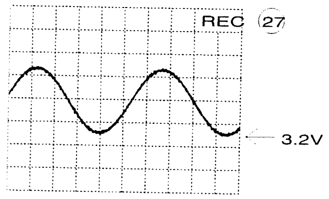
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 13/14



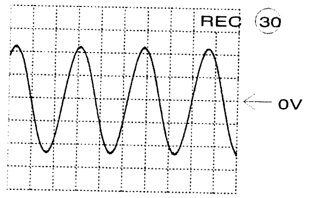
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 15/16



A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 18/19



A: AC, 500mV/Div, 200us/Div
IC 7651 Pin 12



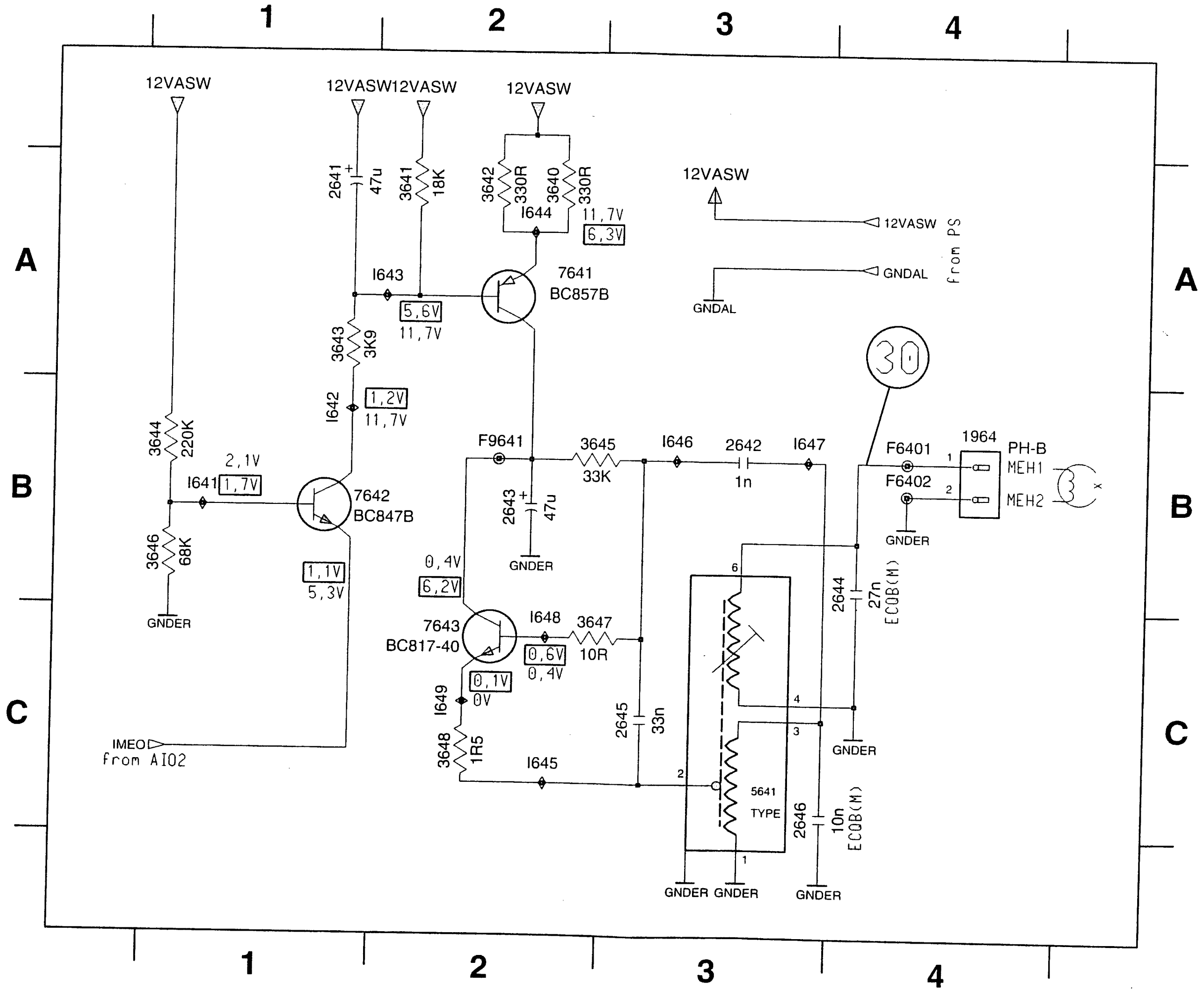
A: DC, 10 V/Div, 5us/Div
Connector 1964 Pin 1

Interconnections Manual Page

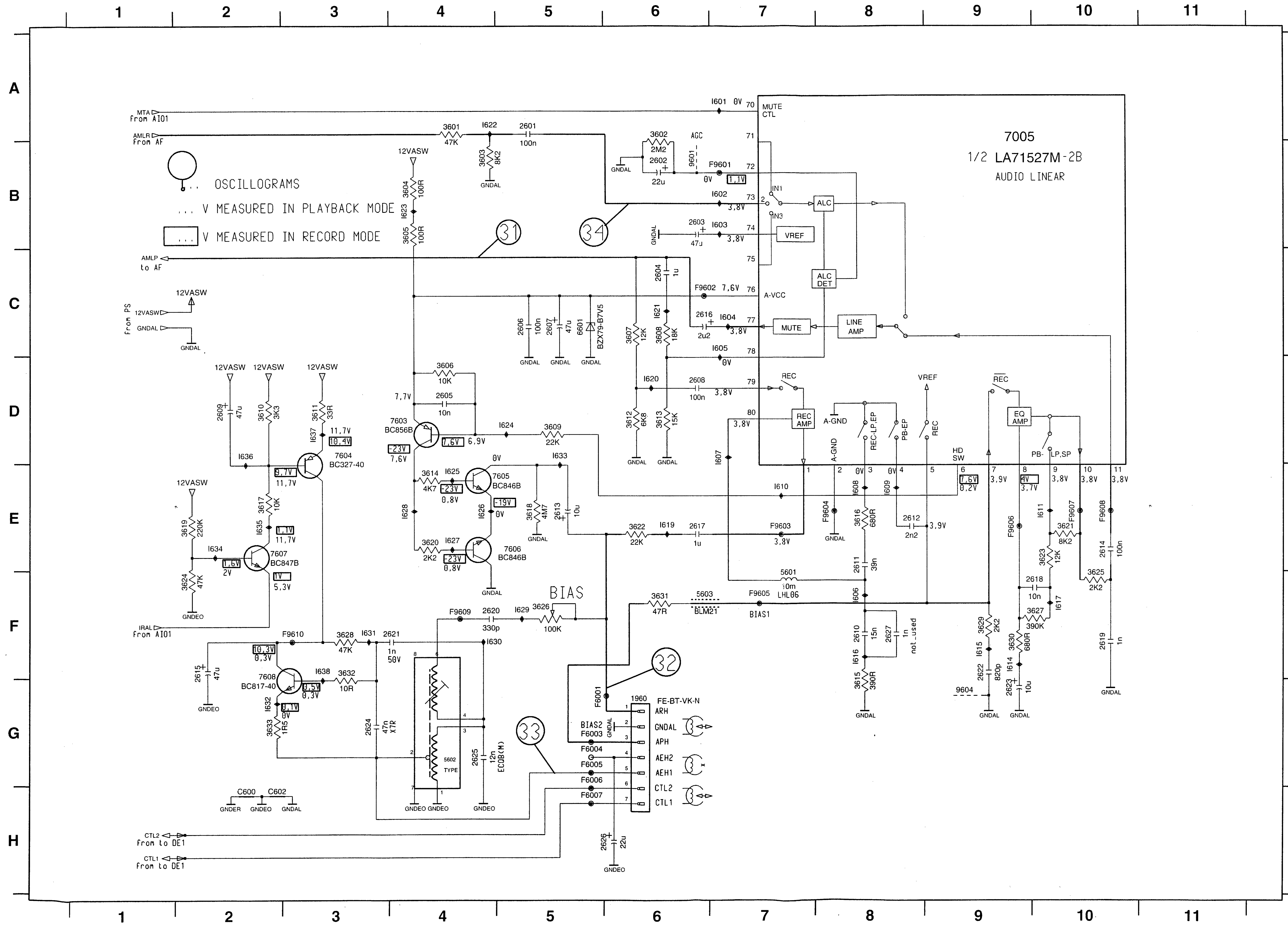
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

Main Erase Oscillator (ER)

1964 B4	2643 B2	2646 C3	3642 A2	3645 B2	3648 C2	7642 B1	F6402 B4	I642 B1	I645 C2	I648 C2
2641 A1	2644 B4	3640 A2	3643 A1	3646 B1	5641 C3	7643 C2	F9641 B2	I643 A2	I646 B3	I649 C2
2642 B3	2645 C3	3641 A2	3644 B1	3647 C2	7641 A2	F6401 B4	I641 B1	I644 A2	I647 B3	


1
2
3
4
A
B
C
12VASW
12VASW12VASW
12VASW
2641 47u
3641 18K
3642 330R
3640 330R
I644
11,7V
6,3V
12VASW
12VASW
GNDAL
From PS
GNDAL
I643
5,6V
11,7V
7641
BC857B
3643 3K9
I642
1,2V
11,7V
30
3644 220K
2,1V
I641
1,7V
7642
BC847B
3646 68K
GNDER
1,1V
5,3V
F9641
3645
33K
I646
2642
1n
I647
2643 47u
GNDER
F6401
F6402
1964
PH-B
MEH1
MEH2
GNDER
0,4V
6,2V
7643
BC817-40
I648
3647
10R
0,6V
0,4V
0,1V
0V
I649
3648 1R5
I645
2645 33n
2644 27n ECOB(M)
5641 TYPE
2646 10n ECOB(M)
GNDER
IMEO
From AI02
GNDER GNDER
GNDER

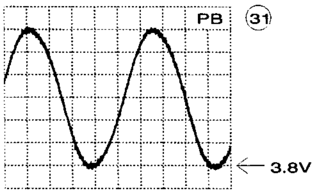
Audio Linear (AL)



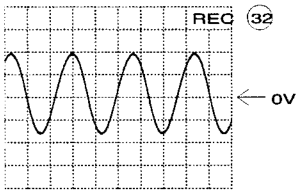
1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
7005
1/2 LA71527M-2B
AUDIO LINEAR
MUTE CTL
A-VCC
ALC
ALC DET
VREF
MUTE
LINE AMP
REC AMP
EQ AMP
A-GND
REC-LP,EP
PB-EP
REC
HD SW
PB-
LP,SP
IN1
IN3
AGC
MTA From AI01
AMLR From AF
AMLP to AF
12VASW From PS
GNDAL
IRAL From AI01
CTL2 From to DE1
CTL1 From to DE1
12VASW
GNDEO
GNDER
GNDEO
C600
C602
7603 BC856B
7604 BC327-40
7605 BC846B
7606 BC846B
7607 BC847B
7608 BC817-40
6601 BZX79-B7V5
3601 47K
3602 2M2
3603 8K2
3604 100R
3605 100R
3606 10K
3607 12K
3608 18K
3609 22K
3610 3K3
3611 33R
3612 6K8
3613 15K
3614 4K7
3616 680R
3617 10K
3618 4M7
3619 220K
3620 2K2
3621 8K2
3622 22K
3623 12K
3624 47K
3625 2K2
3626 100K
3627 390K
3628 47K
3629 2K2
3630 680R
3631 47R
3632 10R
3633 1R5
3615 390R
2601 100n
2602 22u
2603 47u
2604 1u
2605 10n
2606 100n
2607 47u
2608 100n
2609 47u
2610 15n
2611 39n
2612 2n2
2613 10u
2614 100n
2615 47u
2616 2u2
2617 1u
2618 10n
2619 1n
2620 330p
2621 1n 50V
2622 820p
2623 10u
2624 47n XTR
2625 12n ECOB(M)
2626 22u
2627 1n not_used
5601 10m LHL06
5602 TYPE
5603 BLM21
BIAS
BIAS1
BIAS2
1960 FE-BT-VK-N
ARH
GNDAL
APH
AEH2
AEH1
CTL2
CTL1
F6001
F6003
F6004
F6005
F6006
F6007
F9601
F9602
F9603
F9604
F9605
F9606
F9607
F9608
F9609
F9610
9601
9604
31
32
33
34

1960	G6
2601	A5
2602	B6
2603	B6
2604	C6
2605	D4
2606	C5
2607	C5
2608	D6
2609	D2
2610	F8
2611	E8
2612	E8
2613	E5
2614	E10
2615	F2
2616	C6
2617	E6
2618	F10
2619	F10
2620	F4
2621	F4
2622	F9
2623	G9
2624	G3
2625	G4
2626	H6
2627	F8
3601	A4
3602	A6
3603	B4
3604	B4
3605	B4
3606	D4
3607	C6
3608	C6
3609	D5
3610	D2
3611	D3
3612	D6
3613	D6
3614	E4
3615	G8
3616	E8
3617	E2
3618	E5
3619	E2
3620	E4
3621	E10
3622	E6
3623	E10
3624	F2
3625	F10
3626	F5
3627	F10
3628	F3
3629	F9
3630	F9
3631	F6
3632	F3
3633	G2
5601	F7
5602	G4
5603	F6
6601	C5
7005	B9
7603	D4
7604	D3
7605	E4
7606	E5
7607	E2
7608	F2
9601	B6
9604	G9
C600	H2
C602	H2
F6001	G5
F6003	G5
F6004	G5
F6005	G5
F6006	G5
F6007	H5
F9601	B7
F9602	C6
F9603	E7
F9604	E8
F9605	F7
F9606	E9
F9607	E10
F9608	E10
F9609	F4
F9610	F3
I601	A7
I602	B7
I603	B7
I604	C7
I605	C7
I606	F8
I607	D7
I608	E8
I609	E8
I610	E7
I611	E10
I614	F9
I615	F9
I616	F8
I617	F10
I619	E6
I620	D6
I621	C6
I622	A4
I623	B4
I624	D5
I625	E4
I626	E4
I627	E4
I628	E4
I629	F5
I630	F4
I631	F3
I632	G2
I633	D5
I634	E2
I635	E2
I636	D2
I637	D3
I638	F3

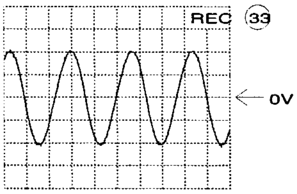
Oscillograms Audio Linear



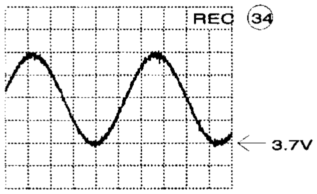
A: AC, 100mV/Div, 200us/Div
IC 7005 Pin 77



A: DC, 20 V/Div, 5us/Div
Connector 1960 Pin 1



A: DC, 5 V/Div, 5us/Div
Connector 1960 Pin 5

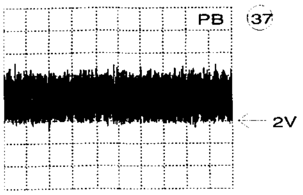


A: AC, 50mV/Div, 200us/Div
IC 7005 Pin 73

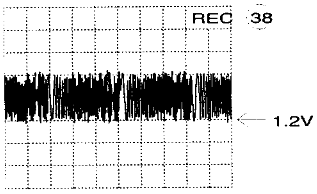
Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

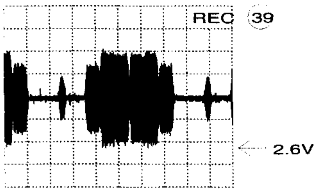
Oscillograms Video Signal Processing



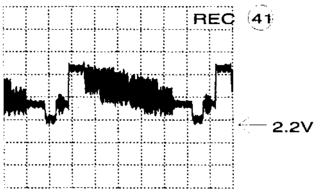
A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



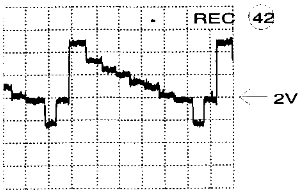
A: AC, 200mV/Div, 20us/Div
FMRV



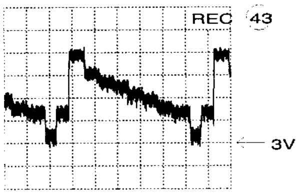
A: AC, 100mV/Div, 10us/Div
CPRV



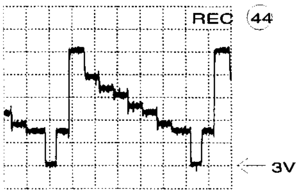
A: AC, 500mV/Div, 10us/Div
IC 7005 Pin 35



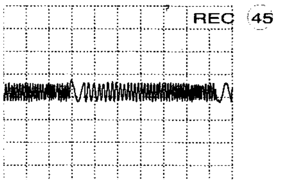
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 42



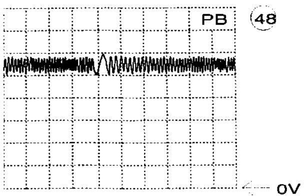
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 40



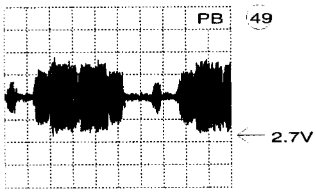
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 26



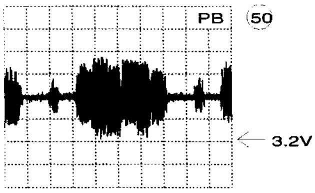
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 18



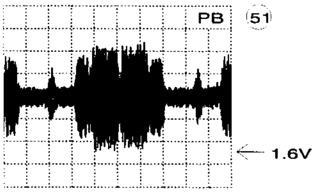
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 20



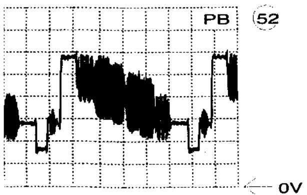
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 48/50



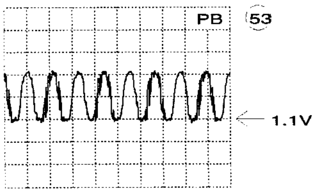
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 52



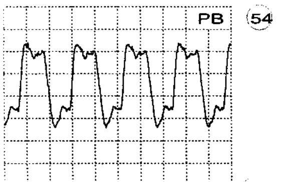
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 45



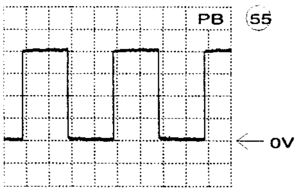
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 35



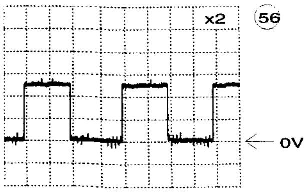
A: AC, 200mV/Div, 100ns/Div
IC 7005 Pin 58



A: DC, 200mV/Div, 100ns/Div
IC 7003 Pin 10



A: DC, 200mV/Div, 10ms/Div
IC 7005 Pin 66



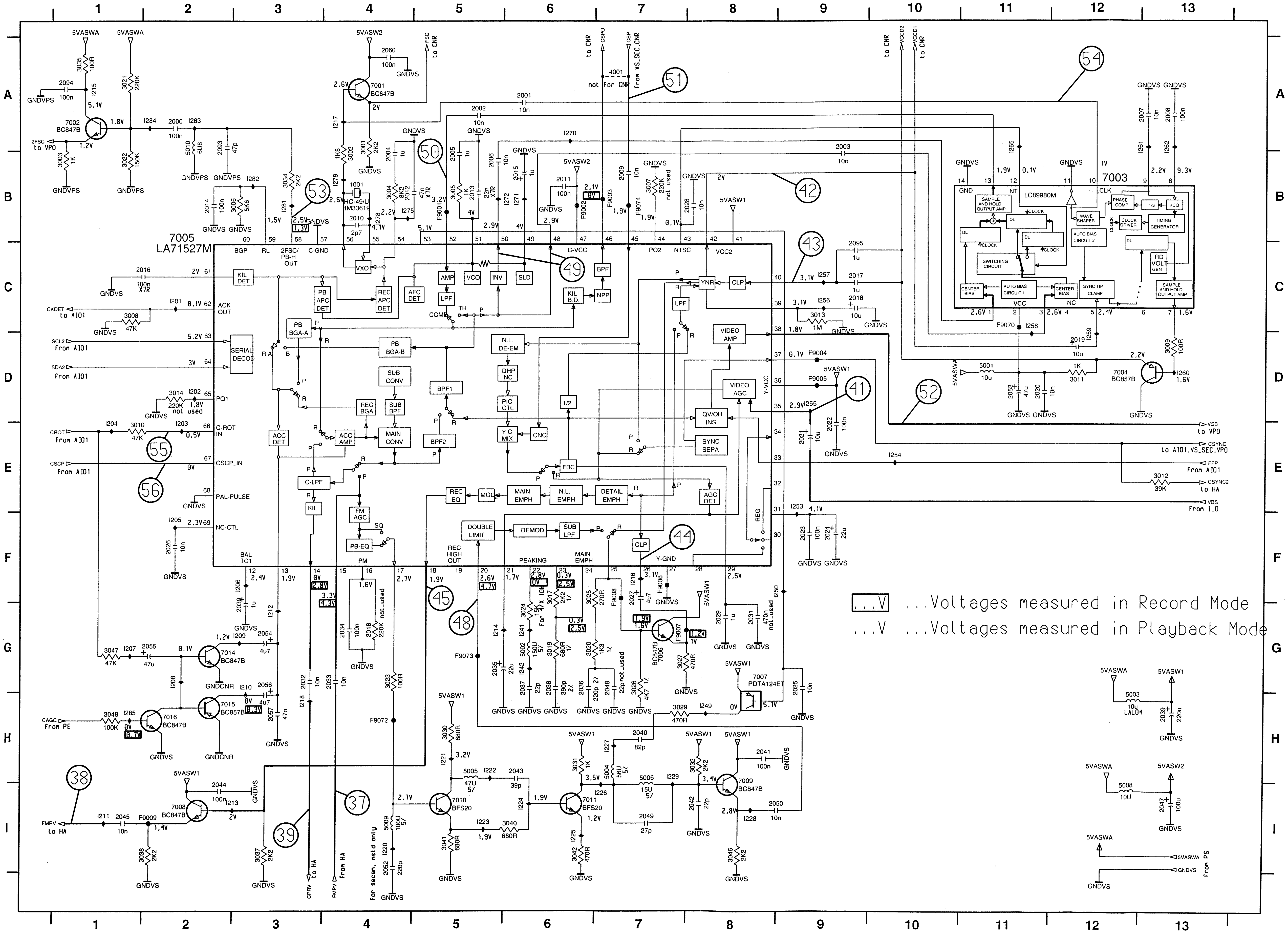
A: DC, 500mV/Div, 10ms/Div
IC 7005 Pin 67

Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

Video Signal Processing (VS)

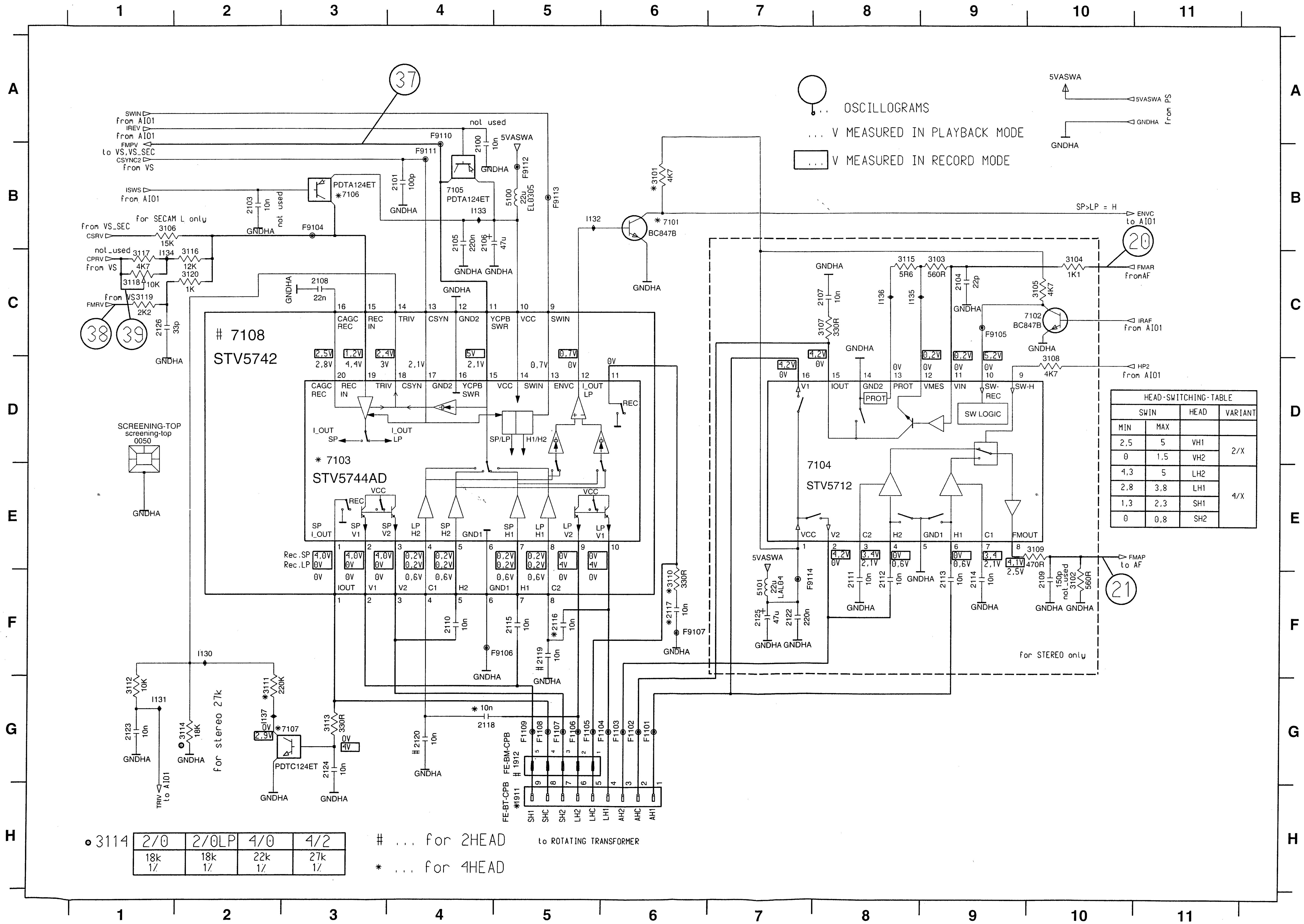
Interconnections	Manual Page							
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	


1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
7005
LA71527M
7003
LC89980M
PDTA124ET
5VASWA
5VASW1
5VASW2
GNDVS
GNDVPS
GNDCNR
2FSC to VPO
CKDET to AIO1
SCL2 From AIO1
SDA2 From AIO1
CROT From AIO1
CSCP From AIO1
CAGC from PE
FMRV to HA
CPRV to HA
FMPV from HA
to CNR
CSPO
CSP From VS_SEC_CNR
VCCD2
VCCD1
VSB to VPO
CSYNC to AIO1,VS_SEC,VPO
FFP From AIO1
CSYNC2 to HA
VBS From I_O
From PS
not For CNR
For secam, mstd only
BGP
RL
2FSC/PB-H OUT
C-GND
C-VCC
PQ2
NTSC
VCC2
ACK OUT
PQ1
C-ROT IN
CSCP_IN
PAL-PULSE
NC-CTL
BAL TC1
PM
REC HIGH OUT
PEAKING
MAIN EMPH
Y-GND
Y-VCC
REG
KIL DET
SERIAL DECOD
PB BGA-A
PB APC DET
REC APC DET
AFC DET
VXO
AMP
VCO
INV
SLD
LPF
COMB
TH
KIL B.D.
NPP
BPF
YNR
CLP
VIDEO AMP
VIDEO AGC
QV/QH INS
SYNC SEPA
PB BGA-B
SUB CONV
REC BGA
SUB BPF
BPF1
BPF2
ACC DET
ACC AMP
MAIN CONV
N.L. DE-EM
DHP NC
PIC CTL
Y C MIX
CNC
1/2
FBC
C-LPF
KIL
FM AGC
PB-EQ
REC EQ
MOD
MAIN EMPH
N.L. EMPH
DETAIL EMPH
AGC DET
DOUBLE LIMIT
DEMOD
SUB LPF
SAMPLE AND HOLD OUTPUT AMP
SWITCHING CIRCUIT
CENTER BIAS
AUTO BIAS CIRCUIT 1
AUTO BIAS CIRCUIT 2
WAVE SHAPER
PHASE COMP
VCO
TIMING GENERATOR
CLOCK DRIVER
RD VOLT GEN
SYNC TIP CLAMP
CLOCK
DL
GND
NT
CLK
VCC
NC
1001 HC-49/U 4M33619
7001 BC847B
7002 BC847B
7004 BC857B
7006 BC847B
7008 BC847B
7009 BC847B
7010 BFS20
7011 BFS20
7014 BC847B
7015 BC857B
7016 BC847B
(38)
(37)
(39)
(41)
(42)
(43)
(44)
(45)
(48)
(49)
(50)
(51)
(52)
(53)
(54)
(55)
(56)
...V ...Voltages measured in Record Mode
...V ...Voltages measured in Playback Mode

1001	B4
2000	A2
2001	A6
2002	A5
2003	A9
2004	B4
2005	B5
2006	B5
2007	A13
2008	A13
2009	B7
2010	B4
2011	B6
2012	B4
2013	B5
2014	B2
2015	B6
2016	C1
2017	C9
2018	C9
2019	D12
2020	D11
2021	E9
2022	E9
2023	F9
2024	F9
2025	G9
2026	F2
2027	F7
2028	B8
2029	G8
2030	G3
2031	G8
2032	G3
2033	G4
2034	G4
2035	G5
2036	G6
2037	G6
2038	G6
2039	H13
2040	H7
2041	H8
2042	I8
2043	H6
2044	I2
2045	I1
2047	I13
2048	G7
2049	I7
2050	I8
2052	I4
2053	D11
2054	G3
2055	G2
2056	G3
2057	H3
2060	A4
2093	A2
2094	A1
2095	C9
3001	A4
3002	B4
3003	B1
3004	B4
3005	B5
3006	B3
3007	B7
3008	C1
3009	D13
3010	E1
3011	D12
3012	E13
3013	C9
3014	D2
3017	F6
3018	G4
3019	G6
3020	G6
3021	A1
3022	B1
3023	G4
3024	G6
3025	F6
3026	G7
3027	G7
3029	H7
3030	H5
3031	H6
3032	H8
3034	B3
3035	A1
3037	I3
3038	I2
3040	I6
3041	I5
3042	I6
3046	I8
3047	G1
3048	H1
4001	A7
5001	D11
5002	G6
5003	H12
5004	H7
5005	H5
5006	H7
5008	I12
5009	I4
5010	A2
7001	A4
7002	A1
7003	B12
7004	D12
7005	B2
7006	G7
7007	G8
7008	I2
7009	I8
7010	I5
7011	I6
7014	G2
7015	H2
7016	H2
F9001	B5
F9002	B6
F9003	B7
F9004	D9
F9005	D9
F9006	F7
F9007	G7
F9008	F7
F9009	I2
F9070	C11
F9072	H4
F9073	G5
F9074	B7
I201	C2
I202	D2
I203	E2
I204	E1
I205	F2
I206	F3
I207	G1
I208	G2
I209	G3
I210	G3
I211	I1
I212	G3
I213	I2
I214	G5
I215	A1
I216	F7
I217	A4
I218	H3
I220	I4
I221	H5
I222	H5
I223	I5
I224	I6
I225	I6
I226	I7
I227	H7
I228	I8
I229	H7
I241	G6
I242	G6
I249	H8
I250	F8
I253	E9
I254	E10
I255	D9
I256	C9
I257	C9
I258	C11
I259	D12
I260	D13
I261	A12
I262	A13
I265	A11
I270	A6
I271	B6
I272	B6
I275	B4
I278	B4
I279	B4
I281	B3
I282	B3
I283	A2
I284	A2
I285	H1

Head Amplifier (HA)

Interconnections		Manual Page							
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
37
SWIN
from AI01
IREV
from AI01
FMPV
to VS,VS_SEC
CSYNC2
from VS
ISWS
from AI01
from VS_SEC
CSRV
for SECAM L only
3106
15K
not_used
CPRV
from VS
3117
4K7
I134
3116
12K
3120
1K
3118
10K
from VS
FMRV
3119
2K2
2126
33p
38
39
GNDHA
2103
10n
not used
PDTA124ET
*7106
F9104
2101
100p
F9110
not used
2100
10n
5VASWA
F9111
7105
PDTA124ET
I133
F9112
5100
22u
EL0305
F9113
2105
220n
2106
47u
2108
22n
I132
*3101
4K7
*7101
BC847B
# 7108
STV5742
CAGC REC
REC IN
TRIV
CSYN
GND2
YCPB SWR
VCC
SWIN
ENVC
I_OUT LP
REC
I_OUT SP
SP/LP
H1/H2
* 7103
STV5744AD
VCC
SP I_OUT
SP V1
SP V2
LP H2
SP H2
GND1
SP H1
LP H1
LP V2
LP V1
Rec.SP
Rec.LP
IOUT
V1
V2
C1
H2
GND1
H1
C2
2110
10n
2115
10n
*2116
10n
F9106
#2119
10n
*3110
330R
*2117
10n
F9107
I130
3112
10K
I131
2123
10n
3114
18K
to AI01
TRIV
for stereo 27k
*3111
220K
I137
*7107
PDTC124ET
3113
330R
2124
10n
#2120
10n
* 10n
2118
F1109
F1108
F1107
F1106
F1105
F1104
F1103
F1102
F1101
FE-BM-CPB
# 1912
FE-BT-CPB
*1911
SH1
SHC
SH2
LH2
LHC
LH1
AH2
AHC
AH1
to ROTATING TRANSFORMER
SCREENING-TOP
screening-top
0050
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
5VASWA
from PS
SP>LP = H
ENVC
to AI01
20
3104
1K1
FMAR
fromAF
3115
5R6
3103
560R
2104
22p
2107
10n
3107
330R
I136
I135
3105
4K7
7102
BC847B
IRAF
from AI01
F9105
3108
4K7
HP2
from AI01
IOUT
GND2
PROT
VMES
VIN
SW-REC
SW-H
SW LOGIC
7104
STV5712
VCC
V2
C2
H2
GND1
H1
C1
FMOUT
3109
470R
FMAP
to AF
21
5101
22u
LAL04
F9114
2125
47u
2122
220n
2111
10n
2112
10n
2113
10n
2114
10n
2109
150p
3102
560R
for STEREO only

HEAD-SWITCHING-TABLE			
SWIN		HEAD	VARIANT
MIN	MAX		
2,5	5	VH1	2/X
0	1,5	VH2	
4,3	5	LH2	4/X
2,8	3,8	LH1	
1,3	2,3	SH1	
0	0,8	SH2	

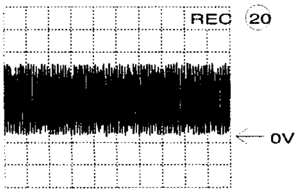
⊙3114	2/0	2/0LP	4/0	4/2
	18k 1%	18k 1%	22k 1%	27k 1%

# ... for 2HEAD

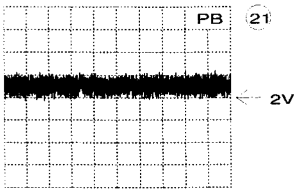
* ... for 4HEAD

0050	D1
1911	H5
1912	G5
2100	B4
2101	B4
2103	B2
2104	C9
2105	B4
2106	B4
2107	C8
2108	C3
2109	F10
2110	F4
2111	F8
2112	F8
2113	F9
2114	F9
2115	F5
2116	F5
2117	F6
2118	G4
2119	F5
2120	G4
2122	F7
2123	G1
2124	G3
2125	F7
2126	C1
3101	B6
3102	F10
3103	C9
3104	C10
3105	C10
3106	B1
3107	C8
3108	D10
3109	E10
3110	F6
3111	G2
3112	G1
3113	G3
3114	G2
3115	C8
3116	C2
3117	C1
3118	C1
3119	C1
3120	C2
5100	B5
5101	F7
7101	B6
7102	C10
7103	E3
7104	E7
7105	B4
7106	B3
7107	G3
7108	C2
F1101	G6
F1102	G6
F1103	G6
F1104	G6
F1105	G5
F1106	G5
F1107	G5
F1108	G5
F1109	G5
F9104	B3
F9105	C9
F9106	F5
F9107	F6
F9110	A4
F9111	B4
F9112	B5
F9113	B5
F9114	F7
I130	F2
I131	G1
I132	B5
I133	B4
I134	C1
I135	C8
I136	C8
I137	G2

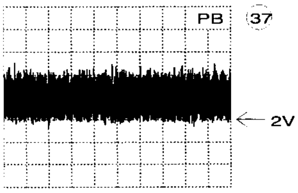
Oscillograms Head Amplifier



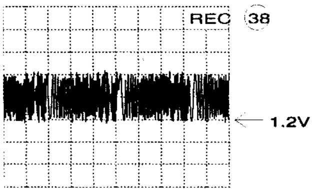
A: DC, 200mV/Div, 5ms/Div
FMAR



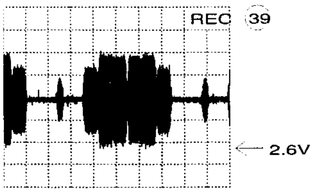
A: AC, 200mV/Div, 500us/Div
FMAP



A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



A: AC, 200mV/Div, 20us/Div
FMRV

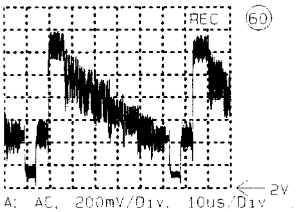


A: AC, 100mV/Div, 10us/Div
CPRV

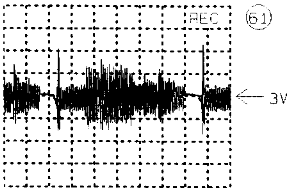
Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

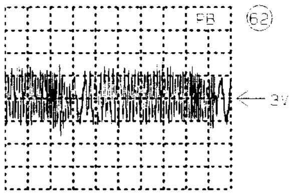
Oscillograms SECAM L Chroma Processing



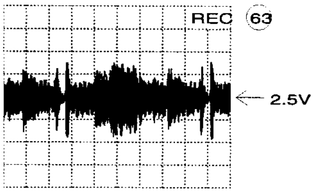
A: AC, 200mV/Div, 10us/Div
IC7072 Pin 15



A: AC, 200mV/Div, 10us/Div
IC 7072 Pin 11



A: AC, 50mV/Div, 10us/Div
IC 7072 Pin 13

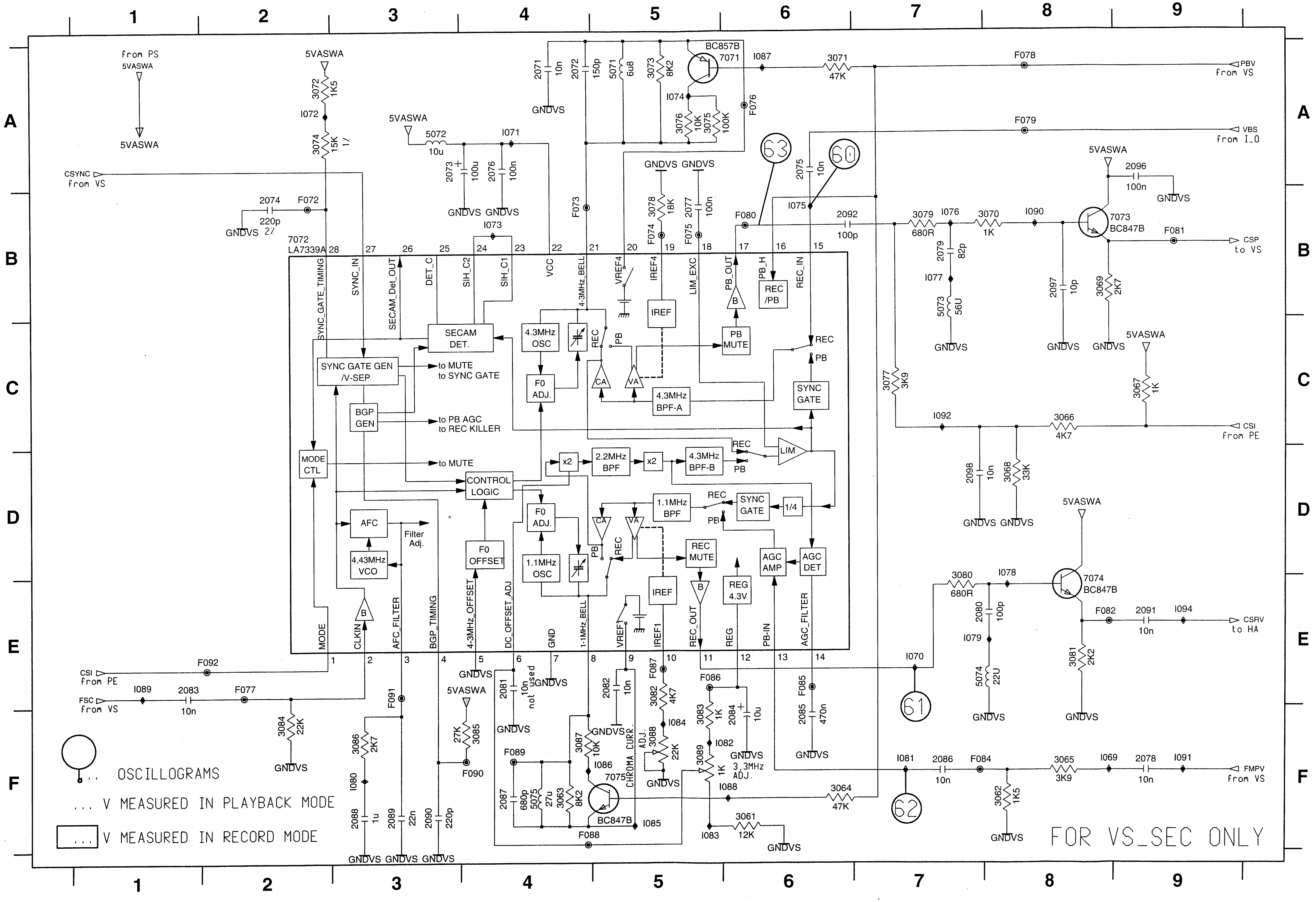


A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 17

Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

Chroma Processing SECAM L (VS_SECAM)

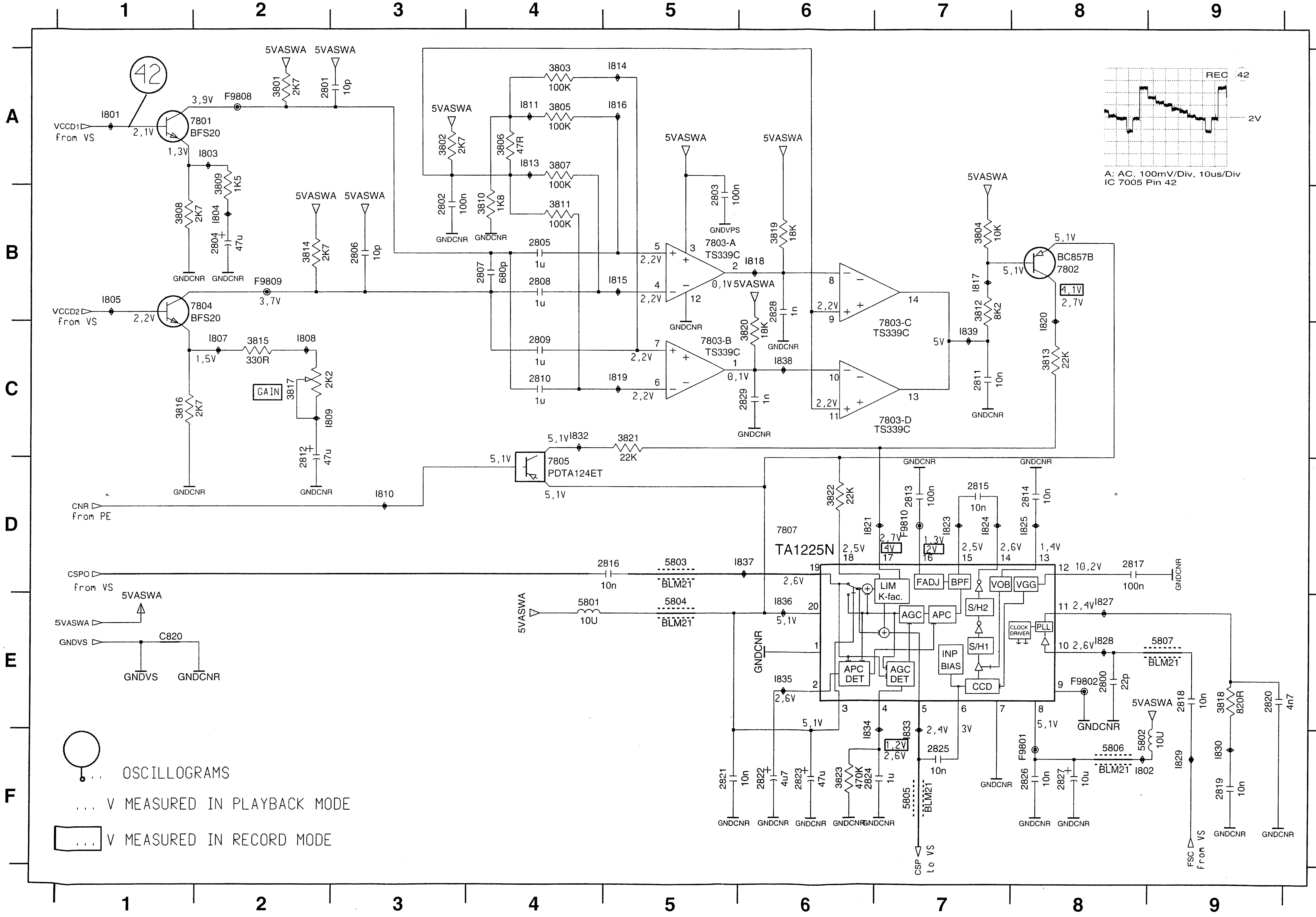

1 2 3 4 5 6 7 8 9
A B C D E F
from PS
5VASWA
5VASWA
CSYNC from VS
2074 220p
F072
GNDVS
3072 1K5
I072
3074 15K
5VASWA
5072 10u
2073 100u
2076 100n
I071
I073
GNDVS
2071 10n
2072 150p
5071 6u8
3073 8K2
BC857B 7071
I074
3076 10K
3075 100K
F076
I087
3071 47K
F078
PBV from VS
F079
VBS from I_0
GNDVS GNDVS
3078 18K
2077 100n
F073
F074
F075
63
60
2075 10n
I075
F080
2092 100p
3079 680R
I076
3070 1K
I090
2079 82p
I077
5073 56U
GNDVS
5VASWA
2096 100n
7073 BC847B
F081
CSP to VS
2097 10p
3069 2K7
7072 LA7339A
28 27 26 25 24 23 22 21 20 19 18 17 16 15
SYNC_GATE_TIMING
SYNC_IN
SECAM_Det_OUT
DET_C
SIH_C2
SIH_C1
VCC
4-3MHz_BELL
VREF4
IREF4
LIM_EXC
PB_OUT
PB_H
REC_IN
SECAM DET.
SYNC GATE GEN /V-SEP
to MUTE
to SYNC GATE
BGP GEN
to PB AGC
to REC KILLER
MODE CTL
to MUTE
CONTROL LOGIC
AFC
Filter Adj.
4,43MHz VCO
F0 OFFSET
4.3MHz OSC
F0 ADJ.
REC PB
CA VA
4.3MHz BPF-A
IREF
PB MUTE
REC /PB
B
REC PB
SYNC GATE
LIM
x2
2.2MHz BPF
x2
4.3MHz BPF-B
REC PB
F0 ADJ.
1.1MHz OSC
1.1MHz BPF
REC PB
SYNC GATE
1/4
REC MUTE
REG 4.3V
AGC AMP
AGC DET
IREF
MODE
CLKIN
AFC_FILTER
BGP_TIMING
4-3MHz_OFFSET
DC_OFFSET_ADJ
GND
1-1MHz_BELL
VREF1
IREF1
REC_OUT
REG
PB-IN
AGC_FILTER
1 2 3 4 5 6 7 8 9 10 11 12 13 14
3077 3K9
I092
3066 4K7
CSI from PE
3067 1K
5VASWA
2098 10n
3068 33K
GNDVS GNDVS
5VASWA
3080 680R
I078
7074 BC847B
2080 100p
I079
5074 22U
I070
61
F082
2091 10n
I094
CSRV to HA
3081 2K2
CSI from PE
F092
FSC from VS
I089
2083 10n
F077
3084 22K
F091
3086 2K7
I080
2088 1u
2089 22n
2090 220p
GNDVS GNDVS GNDVS
GNDVS
2081 10n not used
GNDVS
5VASWA
3085 27K
F090
F089
2087 680p
5075 27u
3063 8K2
3087 10K
I086
7075 BC847B
F088
I085
2082 10n
CHROMA CURR. ADJ.
F087
3082 4K7
I084
3088 22K
F086
3083 1K
I082
3089 1K 3,3MHz ADJ.
I088
2084 10u
GNDVS
2085 470n
F085
GNDVS
3064 47K
I083
3061 12K
GNDVS
I081
62
2086 10n
F084
3062 1K5
GNDVS
3065 3K9
I069
2078 10n
I091
FMPV from VS
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
FOR VS_SEC ONLY

2071	A4
2072	A4
2073	A3
2074	B2
2075	A6
2076	A4
2077	B5
2078	F9
2079	B7
2080	E7
2081	E4
2082	E5
2083	E1
2084	F6
2085	F6
2086	F7
2087	F4
2088	F3
2089	F3
2090	F3
2091	E9
2092	B6
2096	A9
2097	B8
2098	D7
3061	F6
3062	F8
3063	F4
3064	F6
3065	F8
3066	C8
3067	C9
3068	D8
3069	B8
3070	B8
3071	A6
3072	A2
3073	A5
3074	A2
3075	A5
3076	A5
3077	C7
3078	B5
3079	B7
3080	E7
3081	E8
3082	E5
3083	F5
3084	F2
3085	F4
3086	F3
3087	F4
3088	F5
3089	F5
5071	A5
5072	A3
5073	B7
5074	E7
5075	F4
7071	A6
7072	B2
7073	B8
7074	E8
7075	F5
F072	B2
F073	B4
F074	B5
F075	B5
F076	A6
F077	E2
F078	A8
F079	A8
F080	B6
F081	B9
F082	E8
F084	F7
F085	E6
F086	E5
F087	E5
F088	F4
F089	F4
F090	F4
F091	E3
F092	E2
I069	F8
I070	E7
I071	A4
I072	A2
I073	B4
I074	A5
I075	B6
I076	B7
I077	B7
I078	D8
I079	E7
I080	F3
I081	F7
I082	F6
I083	F5
I084	F5
I085	F5
I086	F5
I087	A6
I088	F6
I089	E1
I090	B8
I091	F9
I092	C7
I094	E9

Chroma Noise Reduction (CNR)

Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
42
VCCD1
from VS
VCCD2
from VS
CNR
from PE
CSPO
from VS
5VASWA
GNDVS
GNDCNR
C820
7801
BFS20
7804
BFS20
7802
BC857B
7805
PDTA124ET
7803-A
TS339C
7803-B
TS339C
7803-C
TS339C
7803-D
TS339C
7807
TA1225N
F9808
F9809
F9810
F9801
F9802
GAIN
REC
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 42
2V
LIM
K-fac.
FADJ
BPF
VOB
VGG
AGC
APC
S/H2
S/H1
CLOCK DRIVER
PLL
INP BIAS
APC DET
AGC DET
CCD
BLM21
GNDVPS
CSP
to VS
FSC
from VS
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE

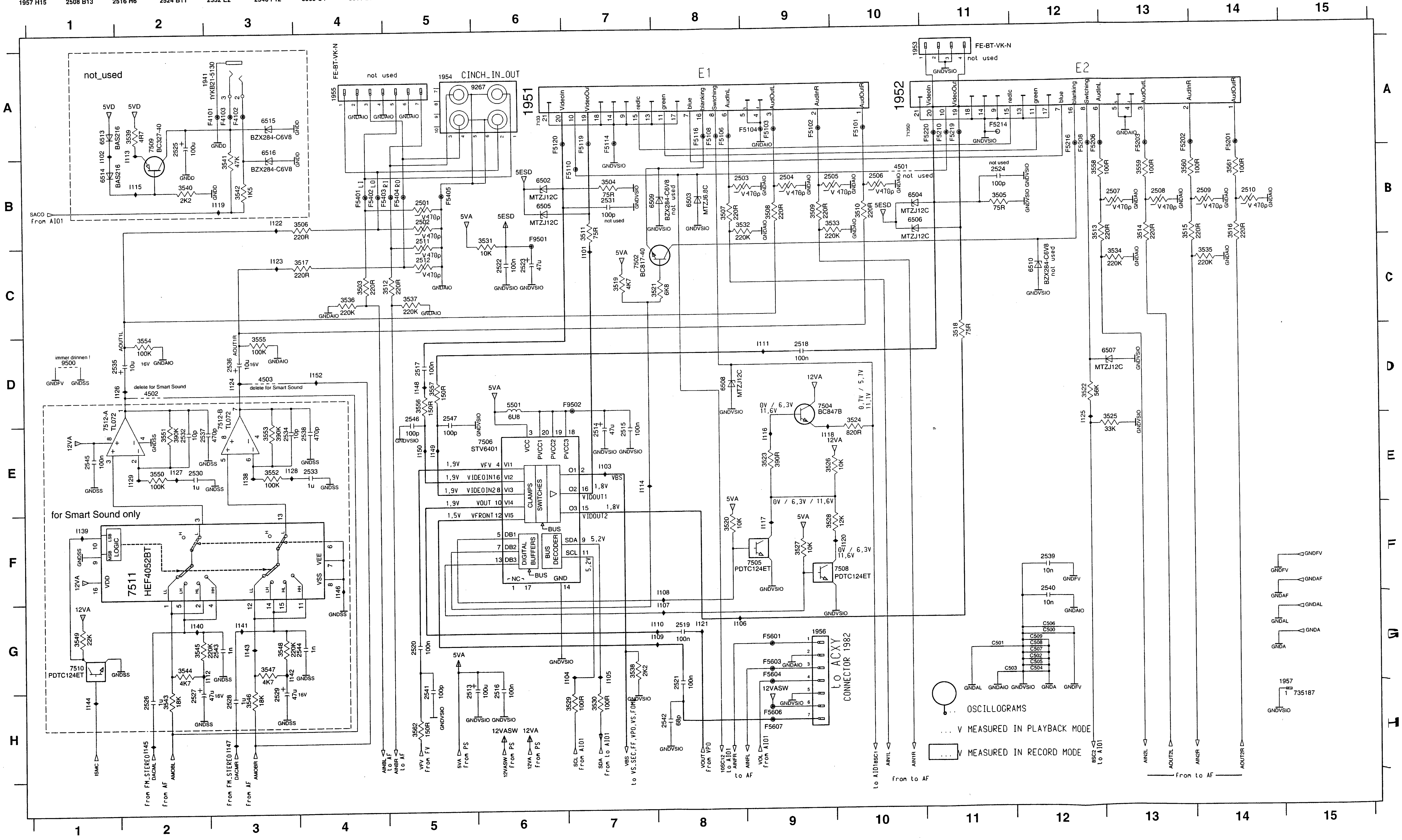
2800	E8
2801	A2
2802	B3
2803	B5
2804	B2
2805	B4
2806	B3
2807	B4
2808	B4
2809	C4
2810	C4
2811	C7
2812	D2
2813	D7
2814	D8
2815	D7
2816	D5
2817	D8
2818	E9
2819	F9
2820	E9
2821	F5
2822	F6
2823	F6
2824	F6
2825	F7
2826	F8
2827	F8
2828	B6
2829	C6
3801	A2
3802	A3
3803	A4
3804	B7
3805	A4
3806	A4
3807	A4
3808	B1
3809	A2
3810	B4
3811	B4
3812	B7
3813	C8
3814	B2
3815	C2
3816	C1
3817	C2
3818	E9
3819	B6
3820	C6
3821	C5
3822	D6
3823	F6
5801	E4
5802	F8
5803	D5
5804	E5
5805	F7
5806	F8
5807	E9
7801	A1
7802	B8
7803-A	B5
7803-B	C5
7803-C	B7
7803-D	C7
7804	B1
7805	D4
7807	D6
C820	E1
F9801	F8
F9802	E8
F9808	A2
F9809	B2
F9810	D7
I801	A1
I802	F8
I803	A2
I804	B2
I805	B1
I807	C2
I808	C2
I809	C2
I810	D3
I811	A4
I813	A4
I814	A5
I815	B5
I816	A5
I817	B7
I818	B6
I819	C5
I820	C8
I821	D6
I823	D7
I824	D7
I825	D8
I827	E8
I828	E8
I829	F9
I830	F9
I832	C4
I833	F7
I834	F6
I835	E6
I836	E6
I837	D6
I838	C6
I839	C7

Input/Output (I_O)

Interconnections — Manual Page

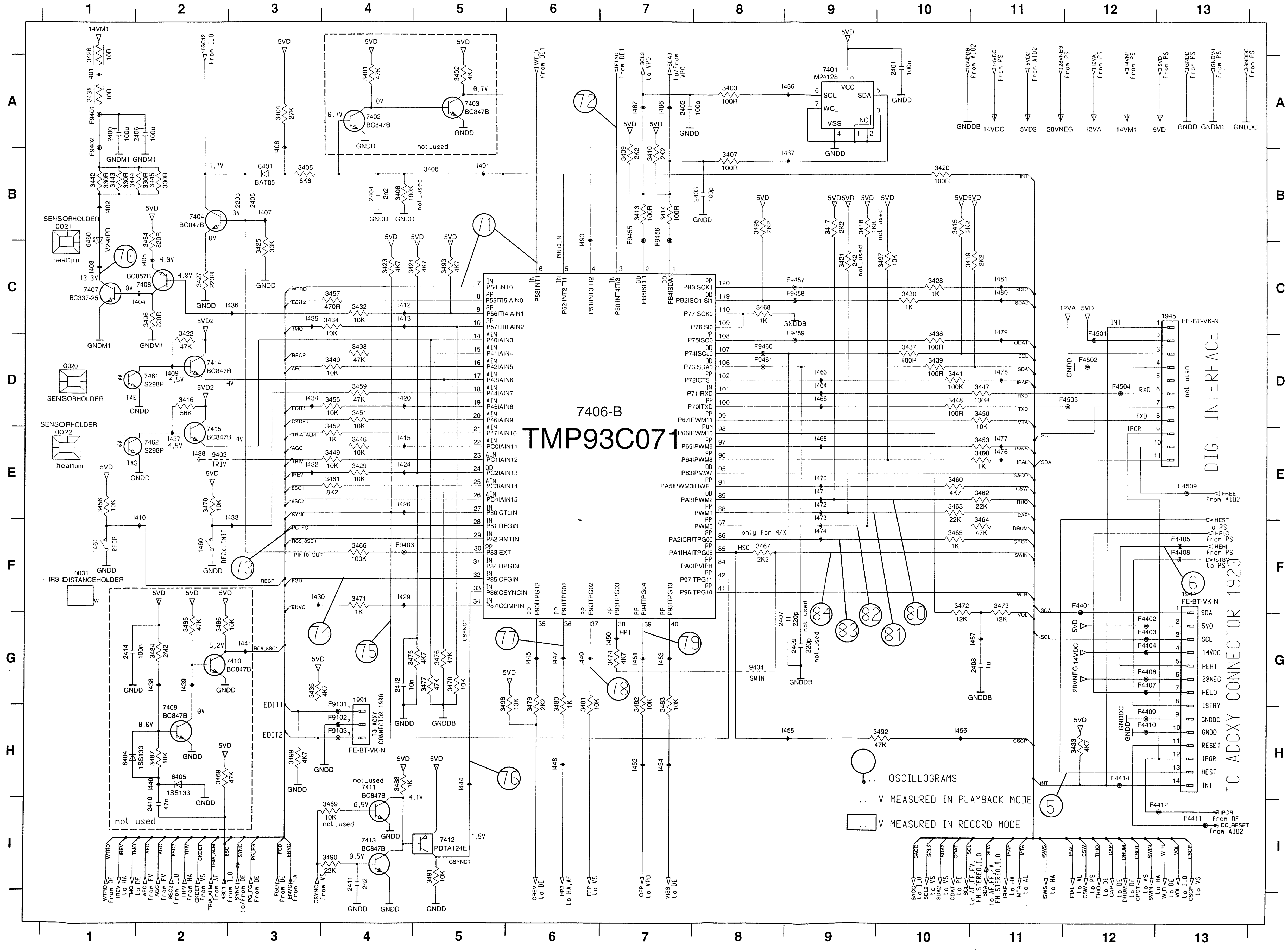
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

1941	A3
1951	A6
1952	A10
1953	A10
1954	A5
1955	A4
1956	G9
1957	H15
2501	B5
2502	B5
2503	B8
2504	B9
2505	B9
2506	B10
2507	B13
2508	B13
2509	B14
2510	B14
2511	B5
2512	C5
2513	H5
2514	E7
2515	E7
2516	H6
2517	D5
2518	D9
2519	G8
2520	G5
2521	G8
2522	C6
2523	C6
2524	B11
2525	A2
2526	H2
2527	H2
2528	H3
2529	H3
2530	E2
2531	B7
2532	E2
2533	E4
2534	E3
2535	D1
2536	D3
2537	E2
2538	E4
2539	F12
2540	F12
2541	H5
2542	H8
2543	G3
2544	G4
2545	E1
2546	D5
2547	D5
3503	C4
3504	B7
3505	B11
3506	B4
3507	B8
3508	B9
3509	B9
3510	B10
3511	B7
3512	C5
3513	B12
3514	B13
3515	B13
3516	B14
3517	C4
3518	D11
3519	C7
3520	F8
3521	C8
3522	D12
3523	E9
3524	E10
3525	E13
3526	E9
3527	F9
3528	F9
3529	H7
3530	H7
3531	B6
3532	B9
3533	B10
3534	C13
3535	C14
3536	C4
3537	C5
3538	G7
3539	A2
3540	B2
3541	B3
3542	B3
3543	H2
3544	G2
3545	G2
3546	H3
3547	G3
3548	G3
3549	G1
3550	E2
3551	E2
3552	E3
3553	E3
3554	D2
3555	D3
3556	D5
3557	D5
3558	B12
3559	B13
3560	B13
3561	B14
3562	H5
4501	B10
4502	D2
4503	D3
5501	D6
6502	B6
6503	B8
6504	B10
6505	B6
6506	B10
6507	D13
6508	D8
6509	B8
6510	C12
6513	A1
6514	B1
6515	A3
6516	A3
7502	C7
7504	D9
7505	F9
7506	E6
7508	F9
7509	A2
7510	G1
7511	F2
7512-A	E1
7512-B	E3
9500	D1
C500	G12
C501	G11
C502	G12
C503	G11
C504	G12
C505	G12
C506	G12
C507	G12
C508	G12
C509	G12
F4101	A3
F4102	A3
F4103	A3
F5101	A10
F5102	A9
F5103	A9
F5104	A9
F5106	A8
F5108	A8
F5110	B7
F5114	A7
F5116	A8
F5119	A7
F5120	A6
F5201	A14
F5202	A13
F5203	A13
F5206	A12
F5208	A12
F5210	A11
F5214	A11
F5216	A12
F5219	A11
F5220	A11
F5401	B4
F5402	B4
F5403	B5
F5404	B5
F5405	B5
F5601	G9
F5603	G9
F5604	G9
F5606	H9
F5607	H9
F9501	B6
F9502	D7
I101	C7
I102	A1
I103	E7
I104	G6
I105	G7
I106	G8
I107	G8
I108	F8
I109	G7
I110	G7
I111	D9
I112	G2
I113	A2
I114	E7
I115	B2
I116	E9
I117	F9
I118	E9
I119	B3
I120	F10
I121	G8
I122	B3
I123	C3
I124	D3
I125	E12
I126	D1
I127	E2
I128	E3
I129	E2
I138	E3
I139	F1
I140	G2
I141	G3
I142	G3
I143	G3
I144	H1
I145	H2
I146	F4
I147	H3
I148	D5
I149	E5
I150	E5
I152	D4



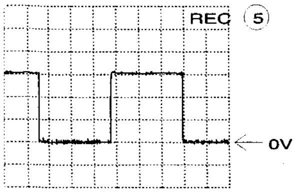
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
not_used
1941 1YKB21-5130
5VD
6513 BAS216
6514 BAS216
7509 BC327-40
3539 4R7
2525 100u
3540 2K2
3541 47K
3542 1K5
6515 BZX284-C6V8
6516 BZX284-C6V8
SACO From AIO1
1955 FE-BT-VK-N
not used
1954 CINCH_IN_OUT
9267
1951
E1
VideoIn
VideoOut
redic
green
blue
blanking
Switching
AudInL
AudOutL
AudInR
AudOutR
1952
E2
1953 FE-BT-VK-N
not used
GNDAIO
GNDVSIO
GNDD
5ESD
6502 MTZJ12C
6505 MTZJ12C
3504 75R
2531 100p
3531 10K
F9501
2522 100n
2523 47u
7502 BC817-40
3519 4K7
3521 6K8
6509 BZX284-C6V8 not used
6503 MTZJ6.8C
2503 V 470p
2504 V 470p
2505 V 470p
2506 V 470p
4501 not used
6504 MTZJ12C
6506 MTZJ12C
2524 100p
3505 75R
6510 BZX284-C6V8 not used
3506 220R
3517 220R
3536 220K
3537 220K
3503 220R
3512 220R
2501 V470p
2502 V470p
2511 V470p
2512 V470p
3507 220R
3508 220R
3532 220K
3509 220R
3510 220R
3533 220K
3558 100R
3559 100R
3560 100R
3561 100R
2507 V470p
2508 V470p
2509 V470p
2510 V470p
3513 220R
3514 220R
3515 220R
3516 220R
3534 220K
3535 220K
3518 75R
2518 100n
6507 MTZJ12C
3522 56K
3525 33K
immer drinnen !
9500
GNDFV GNDSS
3554 100K
3555 100K
2535 10u 16V
2536 10u 16V
delete for Smart Sound
4502
4503
7512-A TL072
7512-B TL072
3551 390K
2532 10p
2537 470p
3553 390K
2534 10p
2538 470p
2545 100n
3550 100K
2530 1u
3552 100K
2533 1u
for Smart Sound only
7511 HEF4052BT
LOGIC
VDD VSS VEE
12VA
3549 22K
7510 PDTC124ET
3543 18K
3544 4K7
2526 1u
2527 47u 16V
3545 220K
2543 1n
3546 18K
3547 4K7
2528 1u
2529 47u 16V
3548 220K
2544 1n
ISMC
From FM_STEREO DACML
From AF AMOBL
From FM_STEREO DACMR
From AF AMOBR
2546 100p
2547 100p
3556 150R
3557 150R
2517 100n
5VA
5501 6U8
F9502
2514 47u
2515 100n
7506 STV6401
VCC PVCC1 PVCC2 PVCC3
VFV VI1
VIDEOIN1 VI2
VIDEOIN2 VI3
VOUT VI4
VFRONT VI5
CLAMPS SWITCHES
VBS
VIDOUT1
VIDOUT2
DB1 DB2 DB3
DIGITAL BUFFERS
BUS DECODER
SDA SCL
GND
1,9V
1,8V
1,5V
5,2V
2520 100n
2541 100p
3562 150R
2513 100u
2516 100n
12VASW
3529 100R
3530 100R
3538 2K2
2521 100n
2542 68p
2519 100n
1956
to ACXY CONNECTOR 1982
F5601
F5603
F5604
F5606
F5607
6508 MTZJ12C
7504 BC847B
0V / 6,3V 11,6V
0,7V / 5,7V 11,1V
3524 820R
3523 390R
3526 10K
3520 10K
7505 PDTC124ET
3527 10K
3528 12K
7508 PDTC124ET
2539 10n
2540 10n
C500 C501 C502 C503 C504 C505 C506 C507 C508 C509
GNDAL GNDAIO GNDVSIO GNDA GNDFV
GNDAF
1957 735187
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
AINBL to AF
AINBR to AF
VFV From FV
5VA From PS
12VASW From PS
12VA From PS
SCL From AIO1
SDA From AIO1
VBS to VS,SEC,FF,VPO,VS,FOME
VOUT From VPO
16SC12 to AIO1
AINFL to AF
AINFR
VOL From AIO1
to AIO18SC1
AIN1L
AIN1R
From to AF
8SC2 to AIO1
AIN2L
AOUT2L
AIN2R
AOUT2R
From to AF

Central / Deck Control 1 (AIO1)

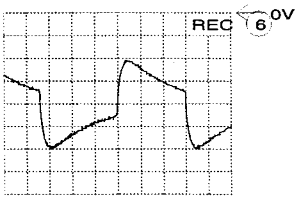

7406-B
TMP93C071
M24128
7401
DIG. INTERFACE
FE-BT-VK-N
1945
TO ADCXY CONNECTOR 1920
1944
FE-BT-VK-N
TO ACXY CONNECTOR 1980
1991
FE-BT-VK-N
SENSORHOLDER 0021
SENSORHOLDER 0020
SENSORHOLDER 0022
IR3-DISTANCEHOLDER 0031
DECK_INIT
RECP
not_used
PDTA124ET
7412
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I

0020	D1
0021	B1
0022	E1
0031	F1
1460	F2
1461	F1
1944	F13
1945	C13
1991	G4
2400	A1
2401	A10
2402	A7
2403	B8
2404	B4
2405	B3
2406	A2
2407	G8
2408	G11
2409	G9
2410	I2
2411	I4
2412	G4
2414	G1
3401	A4
3402	A5
3403	A8
3404	A3
3405	B3
3406	B5
3407	B8
3408	B4
3409	B7
3410	B7
3413	B7
3414	B7
3415	B10
3416	D2
3417	B9
3418	B9
3419	C10
3420	B10
3421	C9
3422	D2
3423	C4
3424	C4
3425	C3
3426	A1
3427	C2
3428	C10
3429	E4
3430	C10
3431	A1
3432	C4
3433	H12
3434	C4
3435	G3
3436	D10
3437	D10
3438	D4
3439	D10
3440	D4
3441	D10
3442	B1
3443	B1
3444	B1
3445	B2
3446	E4
3447	D11
3448	D10
3449	E4
3450	D11
3451	D4
3452	E4
3453	E11
3454	B2
3455	D4
3456	E1
3457	C4
3458	E11
3459	D4
3460	E10
3461	E4
3462	E11
3463	E10
3464	F11
3465	F10
3466	F4
3467	F8
3468	C8
3469	H2
3470	E2
3471	F4
3472	F10
3473	F11
3474	G7
3475	G4
3476	G5
3477	G5
3478	G5
3479	G6
3480	G6
3481	G6
3482	G7
3483	G7
3484	G2
3485	G2
3486	G2
3487	H2
3488	H4
3489	I4
3490	I4
3491	I5
3492	H10
3493	C5
3495	B8
3496	C2
3497	C10
3498	G5
3499	H3
6401	B3
6404	H1
6405	H2
6460	B1
7401	A9
7402	A4
7403	A5
7404	B2
7406-B	D6
7407	C1
7408	C2
7409	H2
7410	G2
7411	H4
7412	I5
7413	I4
7414	D2
7415	E2
7461	D2
7462	E2
9403	E2
9404	G8
F4401	F12
F4402	G12
F4403	G12
F4404	G12
F4405	F13
F4406	G12
F4407	G12
F4408	F13
F4409	H12
F4410	H12
F4411	I13
F4412	I13
F4414	H12
F4501	D12
F4502	D12
F4504	D12
F4505	D12
F4509	E13
F9101	H4
F9102	H4
F9103	H4
F9401	A1
F9402	A1
F9403	F4
F9455	B7
F9456	B7
F9457	C9
F9458	C9
F9459	D9
F9460	D8
F9461	D8
I401	A1
I402	B1
I403	C1
I404	C2
I405	C2
I407	B3
I408	A3
I409	D2
I410	E2
I412	C4
I413	C4
I415	E4
I420	D4
I424	E4
I426	E4
I429	F4
I430	F3
I432	E3
I433	E3
I434	D3
I435	C3
I436	C3
I437	E2
I438	G2
I439	G2
I440	H2
I441	G3
I444	H5
I445	G6
I447	G6
I448	H6
I449	G6
I450	G7
I451	G7
I452	H7
I453	G7
I454	H7
I455	H9
I456	H10
I457	G11
I463	D9
I464	D9
I465	D9
I466	A9
I467	B9
I468	E9
I470	E9
I471	E9
I472	E9
I473	E9
I474	F9
I476	E11
I477	E11
I478	D11
I479	C11
I480	C11
I481	C11
I486	A7
I487	A7
I488	E2
I490	B6
I491	B5

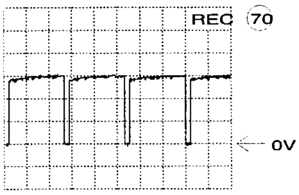
Oscillograms Central / Deck Control



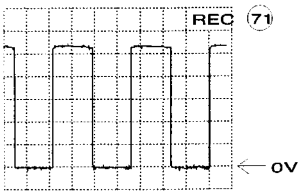
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13



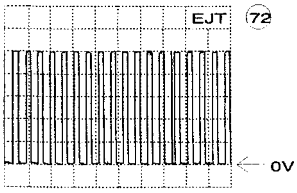
A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5



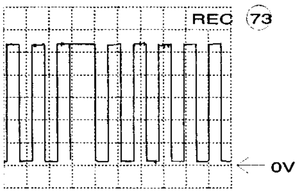
A: DC, 5 V/Div, 5ms/Div
Collector 7407



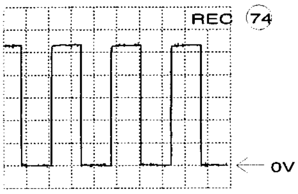
A: DC, 1 V/Div, 200ms/Div
IC 7406 Pin 6/7



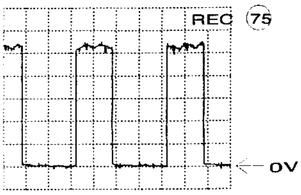
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



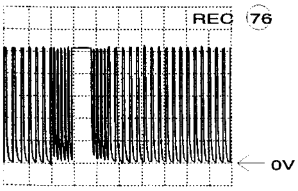
A: DC, 1 V/Div, 2ms/Div
IC 7406 Pin 28



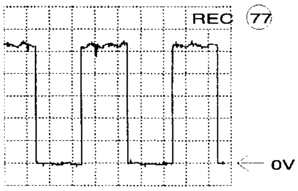
A: DC, 1 V/Div, 500us/Div
IC 7406 Pin 32



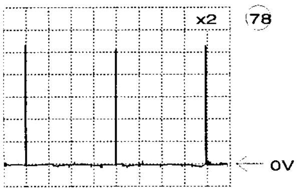
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 27/42



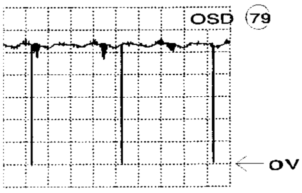
A: DC, 1 V/Div, 200us/Div
IC 7406 Pin 33



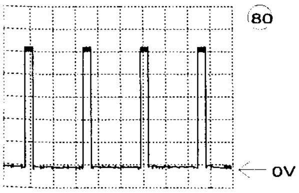
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 36



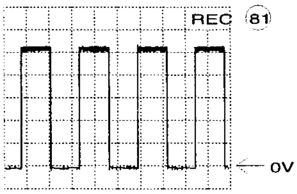
A: DC, 1 V/Div, 5ms/Div
IC 7406 Pin 37



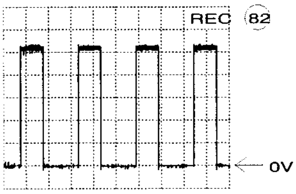
A: DC, 1 V/Div, 5ms/Div
IC 7406 Pin 39



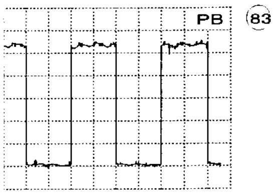
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 89



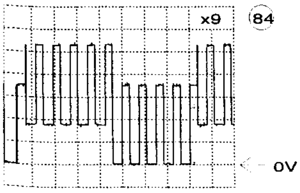
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 88



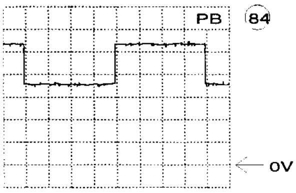
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 87



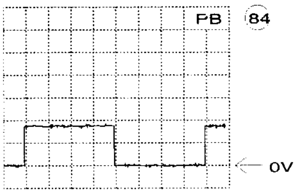
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 86



A: DC, 1 V/Div, 5ms/Div
SWIN



A: DC, 1 V/Div, 5ms/Div
SWIN
Longplay

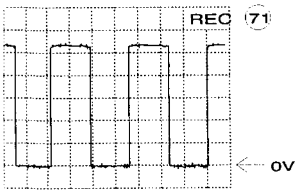


A: DC, 1 V/Div, 5ms/Div
SWIN
Standard Play

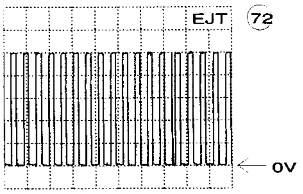
Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	3-42

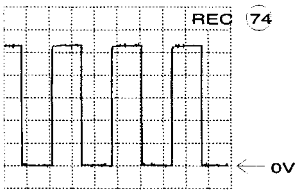
Oscillograms Deck Electronics



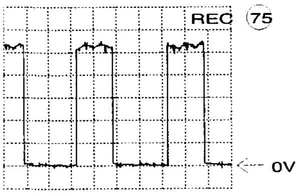
A: DC, 1 V/Div, 200ms/Div
IC 7406 Pin 6/7



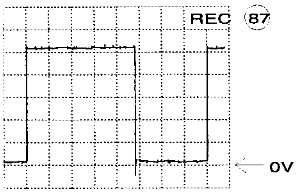
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



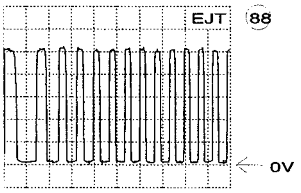
A: DC, 1 V/Div, 500us/Div
IC 7406 Pin 32



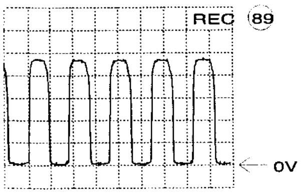
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 27/42



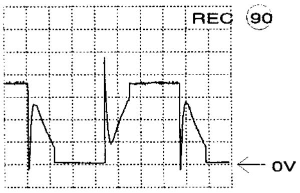
A: DC, 1 V/Div, 5ms/Div
IC 7443 Pin 2



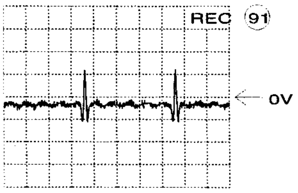
A: DC, 1 V/Div, 20ms/Div
IC 7443 Pin 5



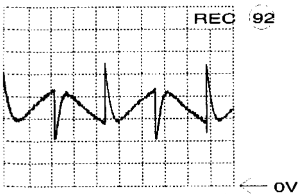
A: DC, 1 V/Div, 500ms/Div
IC 7443 Pin 6/7



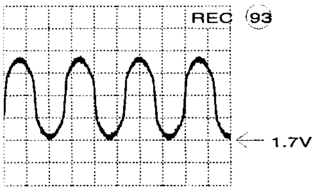
A: DC, 2 V/Div, 1ms/Div
Connector 1948 Pin 1/2/3



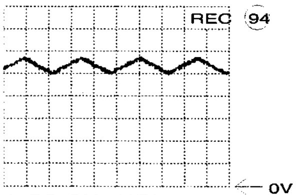
A: DC, 200mV/Div, 10ms/Div
Connector 1948 Pin 5



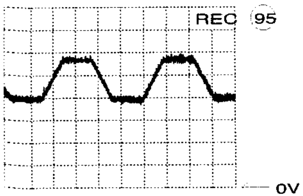
A: DC, 1 V/Div, 500us/Div
Connector 1948 Pin 4



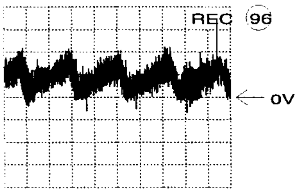
A: DC, 500mV/Div, 500us/Div
Connector 1946 Pin 4



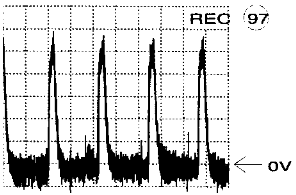
A: DC, 500mV/Div, 10us/Div
Connector 1946 Pin 6



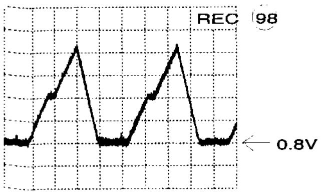
A: DC, 200mV/Div, 500us/Div
IC 7446 Pin 10



A: DC, 50mV/Div, 500us/Div
IC 7446 Pin 11

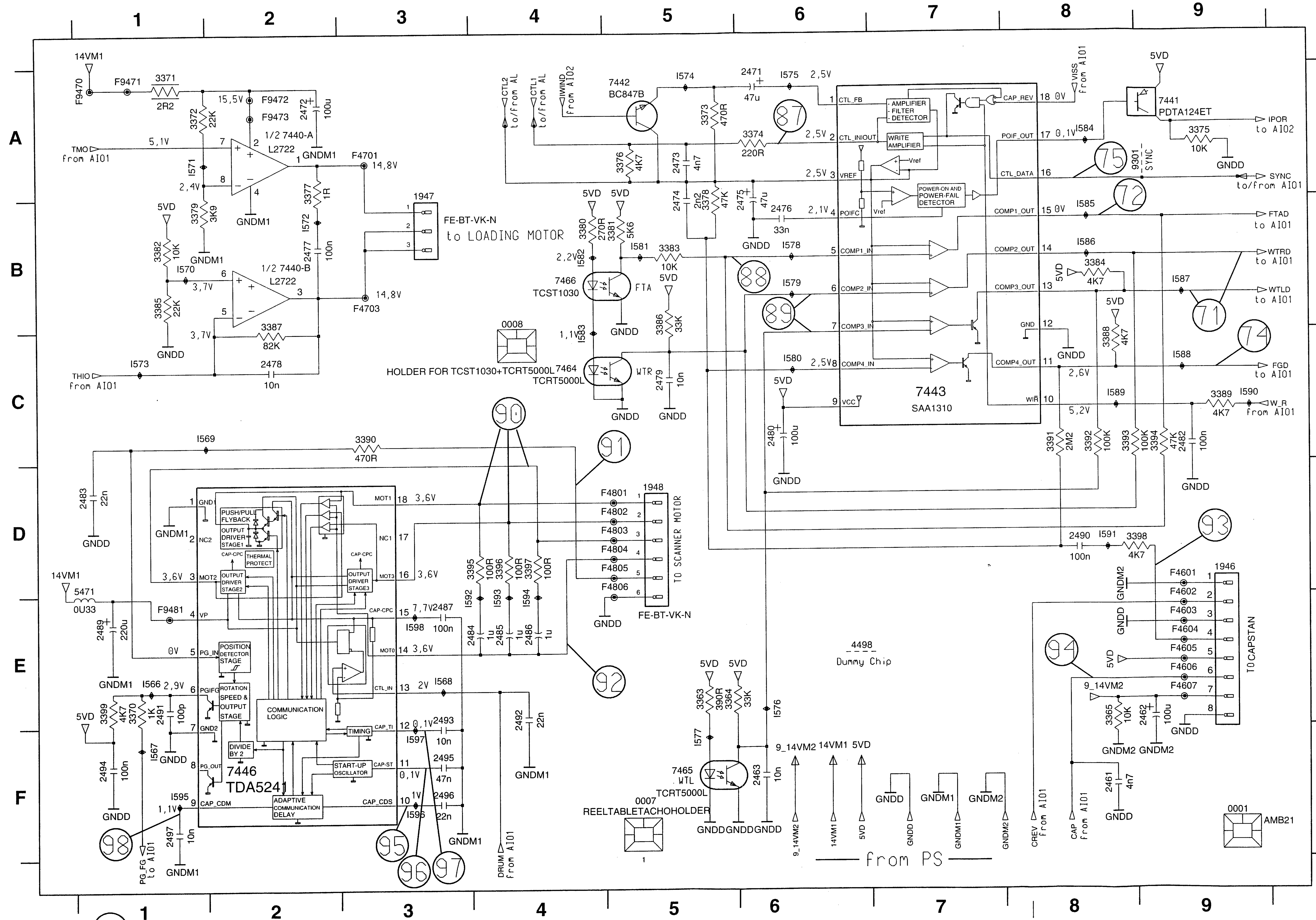


A: DC, 50mV/Div, 500us/Div
IC 7446 Pin 12



A: AC, 200mV/Div, 500us/Div
IC 7446 Pin 9

Deck Electronics (DE)


1 2 3 4 5 6 7 8 9
A B C D E F
14VM1
F9470
F9471
3371 2R2
3372 22K
15,5V
F9472
F9473
2472 100u
1/2 7440-A L2722
GNDM1
TMO from AI01
5,1V
I571
2,4V
3377 1R
F4701 14,8V
1947
FE-BT-VK-N
to LOADING MOTOR
5VD
3379 3K9
3382 10K
I570
3,7V
1/2 7440-B L2722
2477 100n
F4703 14,8V
3385 22K
3387 82K
GNDD
THIO from AI01
I573
2478 10n
CTL2 to/from AL
CTL1 to/from AL
IWIND from AI02
7442 BC847B
I574
2471 47u
I575 2,5V
3373 470R
3374 220R
3376 4K7
2473 4n7
2474 2n2
3378 47K
2475 47u
2476 33n
2,1V
5VD
3380 270R
3381 5K6
2,2V
I582
7466 TCST1030
FTA
I581
3383 10K
1,1V
I583
7464 TCRT5000L
WTR
3386 33K
2479 10n
0008
HOLDER FOR TCST1030+TCRT5000L
CTL_FB
CTL_IN/OUT
VREF
POIFC
COMP1_IN
COMP2_IN
COMP3_IN
COMP4_IN
VCC
AMPLIFIER - FILTER - DETECTOR
WRITE AMPLIFIER
POWER-ON AND POWER-FAIL DETECTOR
CAP_REV 18 0V
POIF_OUT 17 0,1V
CTL_DATA 16
COMP1_OUT 15 0V
COMP2_OUT 14
COMP3_OUT 13
GND 12
COMP4_OUT 11 2,6V
WIR 10 5,2V
7443 SAA1310
VISS from AI01
5VD
7441 PDTA124ET
IPOR to AI02
3375 10K
9301 SYNC
SYNC to/from AI01
FTAD to AI01
WTRD to AI01
WTLD to AI01
FGD to AI01
W_R from AI01
I584 I585 I586 I587 I588 I589 I590
3384 4K7
3388 4K7
3389 4K7
3391 2M2
3392 100K
3393 100K
3394 47K
2482 100n
2480 100u
I578 I579 I580
2,5V
I569
3390 470R
2483 22n
1948
F4801 F4802 F4803 F4804 F4805 F4806
TO SCANNER MOTOR
FE-BT-VK-N
GND1 NC2 MOT2 VP PG_IN PGIFG GND2 PG_OUT CAP_CDM
MOT1 18 3,6V
NC1 17
MOT3 16 3,6V
CAP-CPC 15 7,7V
MOTO 14 3,6V
CTL_IN 13 2V
CAP_TI 12 0,1V
CAP-ST 11 0,1V
CAP_CDS 10 1V
PUSH/PULL FLYBACK
OUTPUT DRIVER STAGE1
OUTPUT DRIVER STAGE2
OUTPUT DRIVER STAGE3
THERMAL PROTECT
POSITION DETECTOR STAGE
ROTATION SPEED & OUTPUT STAGE
COMMUNICATION LOGIC
TIMING
DIVIDE BY 2
START-UP OSCILLATOR
ADAPTIVE COMMUNICATION DELAY
7446 TDA5241
14VM1
5471 0U33
F9481
2489 220u
0V
I566 2,9V
3399 4K7
3370 1K
2491 100p
I567
2494 100n
I595 1,1V
2497 10n
PG_FG to AI01
3395 100R
3396 100R
3397 100R
I592 I593 I594
2484 1u
2485 1u
2486 1u
2487 100n
I598
I568
2492 22n
2493 10n
I597
2495 47n
2496 22n
I596
DRUM from AI01
4498 Dummy Chip
3363 390R
3364 33K
I577
I576
7465 WTL TCRT5000L
2463 10n
0007 REELTABLETACHOHOLDER
9_14VM2 14VM1 5VD
GNDD GNDM1 GNDM2
from PS
2490 100n
I591
3398 4K7
1946
F4601 F4602 F4603 F4604 F4605 F4606 F4607
TO CAPSTAN
9_14VM2
3365 10K
2462 100u
2461 4n7
CREV from AI01
CAP from AI01
0001 AMB21
87 75 72 88 89 71 74 90 91 92 93 94 95 96 97 98

OSCILLOGRAMS

... V MEASURED IN PLAYBACK MODE

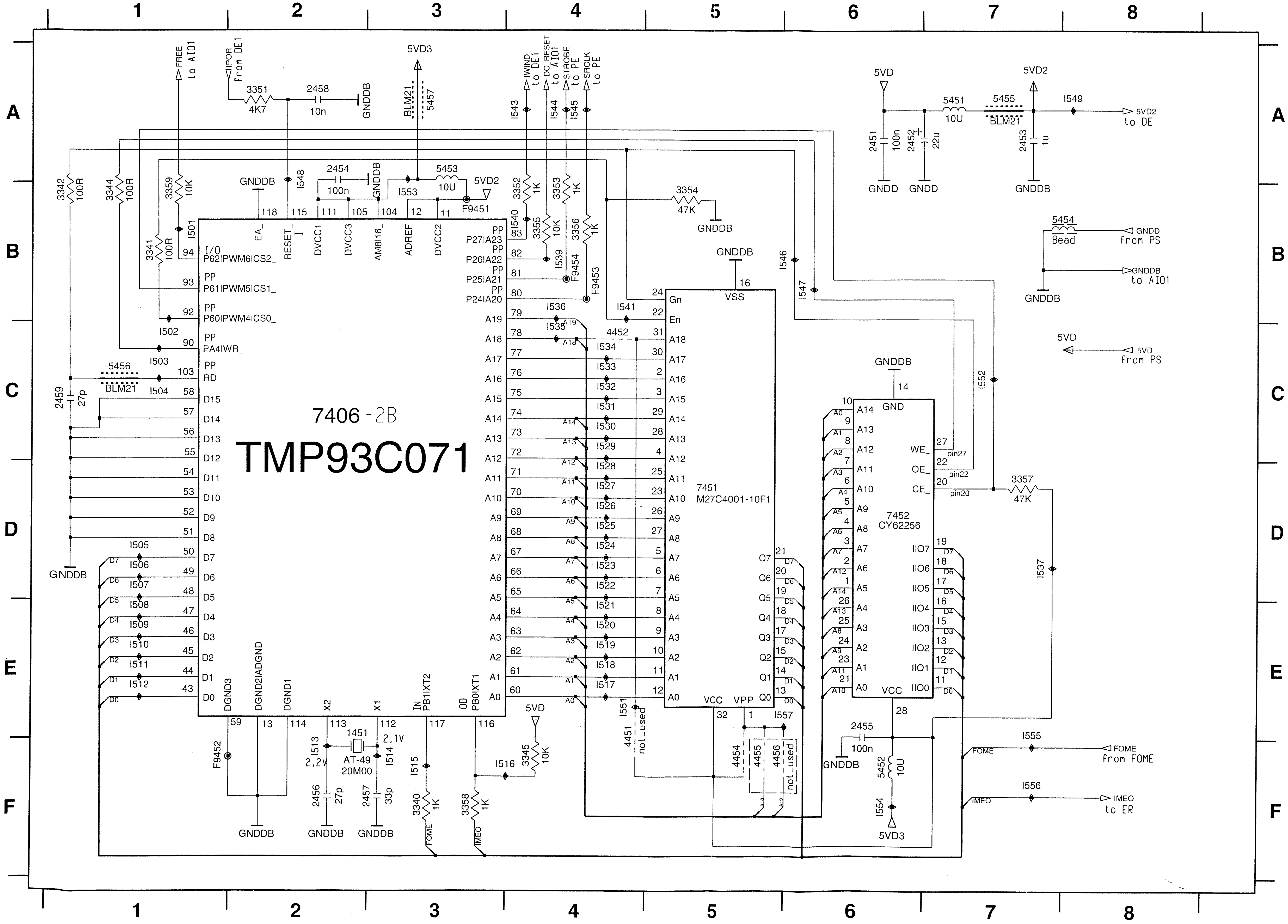
[...] V MEASURED IN RECORD MODE

0001	F9
0007	F5
0008	B4
1946	D9
1947	A3
1948	D5
2461	F8
2462	E9
2463	F6
2471	A6
2472	A2
2473	A5
2474	B5
2475	B6
2476	B6
2477	B2
2478	C2
2479	C5
2480	C6
2482	C9
2483	D1
2484	E4
2485	E4
2486	E4
2487	E3
2489	E1
2490	D8
2491	E1
2492	E4
2493	E3
2494	F1
2495	F3
2496	F3
2497	F1
3363	E5
3364	E5
3365	E8
3370	E1
3371	A1
3372	A1
3373	A5
3374	A6
3375	A9
3376	A5
3377	A2
3378	B5
3379	B1
3380	B4
3381	B5
3382	B1
3383	B5
3384	B8
3385	B1
3386	B5
3387	B2
3388	C8
3389	C9
3390	C3
3391	C8
3392	C8
3393	C8
3394	C9
3395	D4
3396	D4
3397	D4
3398	D8
3399	E1
4498	E6
5471	D1
7440-A	A2
7440-B	B2
7441	A9
7442	A5
7443	C7
7446	F2
7464	C4
7465	F5
7466	B4
9301	A8
F4601	D9
F4602	E9
F4603	E9
F4604	E9
F4605	E9
F4606	E9
F4607	E9
F4701	A3
F4703	B3
F4801	D5
F4802	D5
F4803	D5
F4804	D5
F4805	D5
F4806	D5
F9470	A1
F9471	A1
F9472	A2
F9473	A2
F9481	E1
I566	E1
I567	F1
I568	E3
I569	C1
I570	B1
I571	A1
I572	B2
I573	C1
I574	A5
I575	A6
I576	E6
I577	F5
I578	B6
I579	B6
I580	C6
I581	B5
I582	B4
I583	C4
I584	A8
I585	B8
I586	B8
I587	B9
I588	C9
I589	C8
I590	C9
I591	D8
I592	E3
I593	E4
I594	E4
I595	F1
I596	F3
I597	F3
I598	E3

Central / Deck Control 2 (AIO2)

Interconnections Manual Page

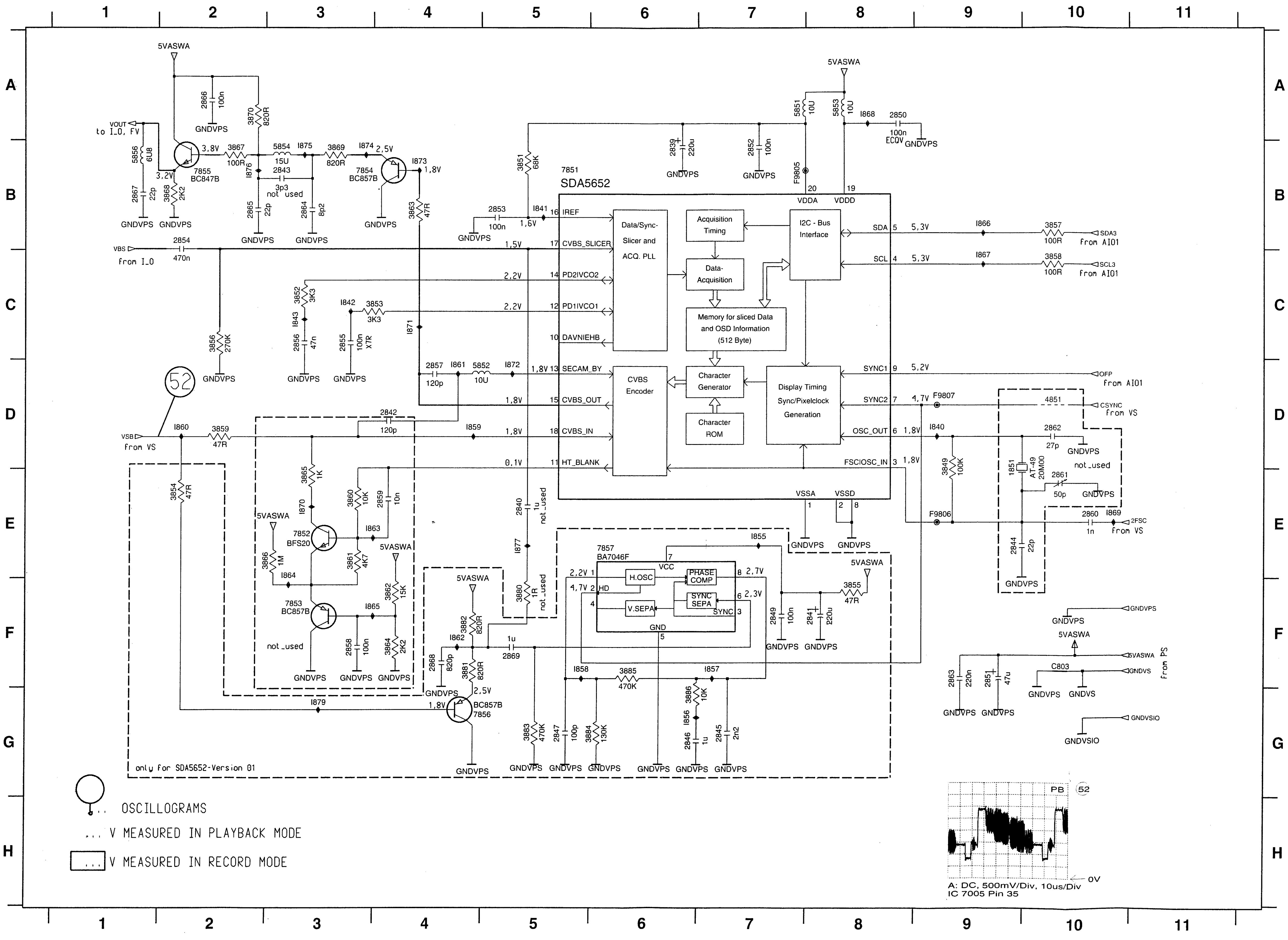
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	3-42


1
2
3
4
5
6
7
8
A
B
C
D
E
F
FREE to AIO1
IPOR from DE1
5VD3
WIND to DE1
DC_RESET to AIO1
STROBE to PE
SRCLK to PE
3351 4K7
2458 10n
GNDDB
BLM21 5457
I543
I544
I545
3342 100R
3344 100R
3359 10K
3341 100R
2454 100n
5453 10U
5VD2
I553
F9451
I548
3352 1K
3353 1K
3354 47K
3355 10K
3356 1K
I540
I539
F9454
F9453
I501
I502
I503
I504
5456 BLM21
2459 27p
I505
I506
I507
I508
I509
I510
I511
I512
7406 -2B
TMP93C071
EA_
RESET_I
DVCC1
DVCC3
AM8I16_
ADREF
DVCC2
P62IPWM6ICS2_
P61IPWM5ICS1_
P60IPWM4ICS0_
PA4IWR_
RD_
P27IA23
P26IA22
P25IA21
P24IA20
DGND3
DGND2IADGND
DGND1
X2
X1
PB1IXT2
PB0IXT1
F9452
1451 AT-49 20M00
I513 2.2V
I514 2.1V
2456 27p
2457 33p
I515
3340 1K
3358 1K
I516
3345 10K
5VD
FOME
IMEO
I536
I535
I541
4452
I534
I533
I532
I531
I530
I529
I528
I527
I526
I525
I524
I523
I522
I521
I520
I519
I518
I517
I551
4451 not_used
I546
I547
7451 M27C4001-10F1
VSS
Gn
En
VCC
VPP
I557
4454
4455
4456 not_used
7452 CY62256
GND
WE_
OE_
CE_
pin27
pin22
pin20
3357 47K
I537
I552
2455 100n
5452 10U
I554
5VD3
I555
FOME from FOME
I556
IMEO to ER
5VD
5VD2
5451 10U
5455 BLM21
I549
5VD2 to DE
2451 100n
2452 22u
2453 1u
GNDD
5454 Bead
GNDD from PS
GNDDB to AIO1
5VD from PS

1451	E2
2451	A6
2452	A6
2453	A7
2454	A2
2455	E6
2456	F2
2457	F3
2458	A2
2459	C1
3340	F3
3341	B1
3342	B1
3344	B1
3345	F4
3351	A2
3352	B4
3353	B4
3354	B5
3355	B4
3356	B4
3357	D7
3358	F3
3359	B1
4451	E4
4452	C4
4454	F5
4455	F5
4456	F5
5451	A7
5452	F6
5453	A3
5454	B8
5455	A7
5456	C1
5457	A3
7406	C2
7451	D5
7452	D6
F9451	B3
F9452	F1
F9453	B4
F9454	B4
I501	B1
I502	C1
I503	C1
I504	C1
I505	D1
I506	D1
I507	D1
I508	E1
I509	E1
I510	E1
I511	E1
I512	E1
I513	F2
I514	F3
I515	F3
I516	F4
I517	E4
I518	E4
I519	E4
I520	E4
I521	E4
I522	D4
I523	D4
I524	D4
I525	D4
I526	D4
I527	D4
I528	D4
I529	C4
I530	C4
I531	C4
I532	C4
I533	C4
I534	C4
I535	C4
I536	B4
I537	D7
I539	B4
I540	B4
I541	B4
I543	A4
I544	A4
I545	A4
I546	B5
I547	B6
I548	A2
I549	A8
I551	E4
I552	C7
I553	B3
I554	F6
I555	E7
I556	F7
I557	E6

OSD Part (VPO)

Interconnections								Manual Page
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	3-42

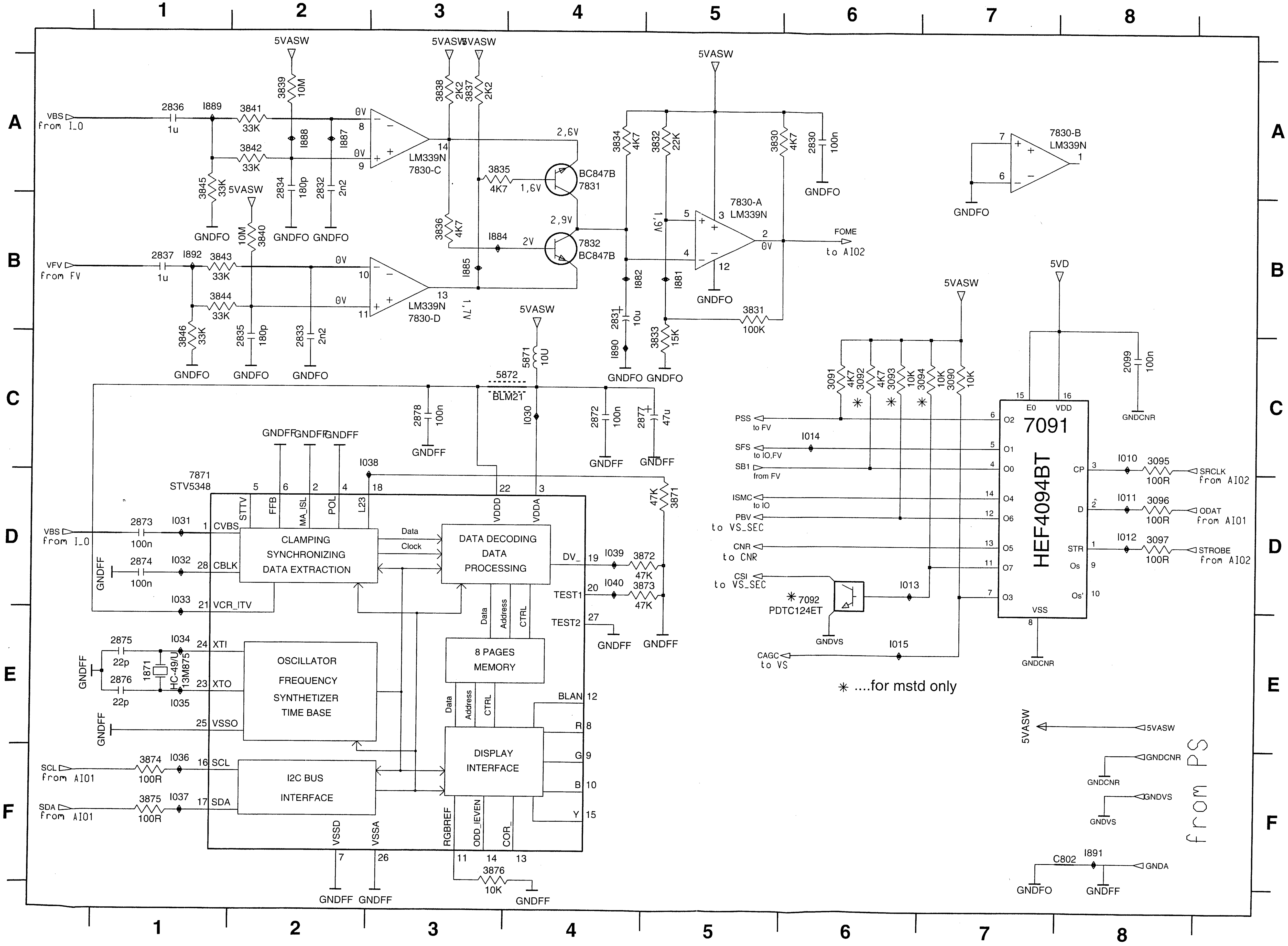

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
5VASWA
2866 100n
GNDVPS
3870 820R
VOUT
to I_O, FV
5856 6U8
3,8V
3867 100R
5854 15U
1875
3869 820R
1874 2,5V
1873 1,8V
7855 BC847B
3,2V
1876
2843 3p3 not used
7854 BC857B
2867 22p
3868 2K2
2865 22p
2864 8p2
3863 47R
GNDVPS
VBS
from I_O
2854 470n
3852 3K3
1842
3853 3K3
1843
2856 47n
2855 100n X7R
1871
3856 270K
52
2842 120p
VSB
from VS
1860
3859 47R
3865 1K
1870
3860 10K
2859 10n
1863
5VASWA
7852 BFS20
3866 1M
3861 4K7
1864
3862 15K
7853 BC857B
1865
not_used
2858 100n
3864 2K2
3854 47R
2857 120p
1861
5852 10U
1872
1859
1879
5VASWA
3882 820R
1862
2868 820p
3881 820R
2,5V
1,8V
BC857B 7856
1u 2869
only for SDA5652-Version 01
3851 68K
2853 100n
1841
1,6V
1,5V
2,2V
2,2V
1,8V
1,8V
1,8V
0,1V
2840 1u not_used
1877
3880 1R not_used
7851
SDA5652
2839 220u
2852 100n
5851 10U
5853 10U
1868
2850 100n ECQV
F9805
20
19
VDDA
VDDD
16 IREF
17 CVBS_SLICER
14 PD2IVCO2
12 PD1IVCO1
10 DAVNIEHB
13 SECAM_BY
15 CVBS_OUT
18 CVBS_IN
11 HT_BLANK
Data/Sync-Slicer and ACQ. PLL
Acquisition Timing
Data-Acquisition
I2C - Bus Interface
Memory for sliced Data and OSD Information (512 Byte)
CVBS Encoder
Character Generator
Character ROM
Display Timing Sync/Pixelclock Generation
SDA 5
SCL 4
SYNC1 9
SYNC2 7
OSC_OUT 6
FSC/OSC_IN 3
VSSA 1
VSSD 2 8
5,3V
5,3V
5,2V
4,7V
1,8V
1,8V
1866
1867
3857 100R
3858 100R
SDA3 from AIO1
SCL3 from AIO1
OFP from AIO1
F9807
4851
CSYNC from VS
1840
3849 100K
2862 27p
1851 AT-49 20M00
not_used
2861 50p
F9806
2860 1n
1869
2FSC from VS
2844 22p
1855
7857 BA7046F
VCC
H.OSC
PHASE COMP
V.SEPA
SYNC SEPA
GND
2,2V 1
4,7V 2 HD
4
7
8 2,7V
6 2,3V
SYNC 3
5
5VASWA
3855 47R
2849 100n
2841 220u
1858
3885 470K
1857
3886 10K
1856
2846 1u
2845 2n2
2847 100p
3884 130K
3883 470K
GNDVPS
GNDVPS
5VASWA
5VASWA
GNDVS
C803
2863 220n
2851 47u
GNDVS
from PS
GNDVSIO
PB
52
0V
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 35
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE

1851	D9
2839	B6
2840	E5
2841	F8
2842	D4
2843	B3
2844	E9
2845	G7
2846	G6
2847	G5
2849	F7
2850	A8
2851	F9
2852	B7
2853	B5
2854	B2
2855	C3
2856	C3
2857	D4
2858	F3
2859	E4
2860	E10
2861	E10
2862	D10
2863	F9
2864	B3
2865	B2
2866	A2
2867	B1
2868	F4
2869	F5
3849	D9
3851	B5
3852	C3
3853	C3
3854	E2
3855	F8
3856	C2
3857	B10
3858	C10
3859	D2
3860	E3
3861	E3
3862	F4
3863	B4
3864	F4
3865	E3
3866	E3
3867	B2
3868	B2
3869	B3
3870	A2
3880	F5
3881	F4
3882	F4
3883	G5
3884	G6
3885	F6
3886	G6
4851	D10
5851	A7
5852	D4
5853	A8
5854	B3
5856	B1
7851	B5
7852	E3
7853	F3
7854	B3
7855	B2
7856	G4
7857	E6
C803	F10
F9805	B7
F9806	E9
F9807	D9
I840	D9
I841	B5
I842	C3
I843	C3
I855	E7
I856	G6
I857	F7
I858	F5
I859	D4
I860	D2
I861	D4
I862	F4
I863	E3
I864	E3
I865	F3
I866	B9
I867	C9
I868	A8
I869	E10
I870	E3
I871	C4
I872	D5
I873	B4
I874	B3
I875	B3
I876	B2
I877	E5
I879	G3

Follow me part (FOME, VPS, PE)

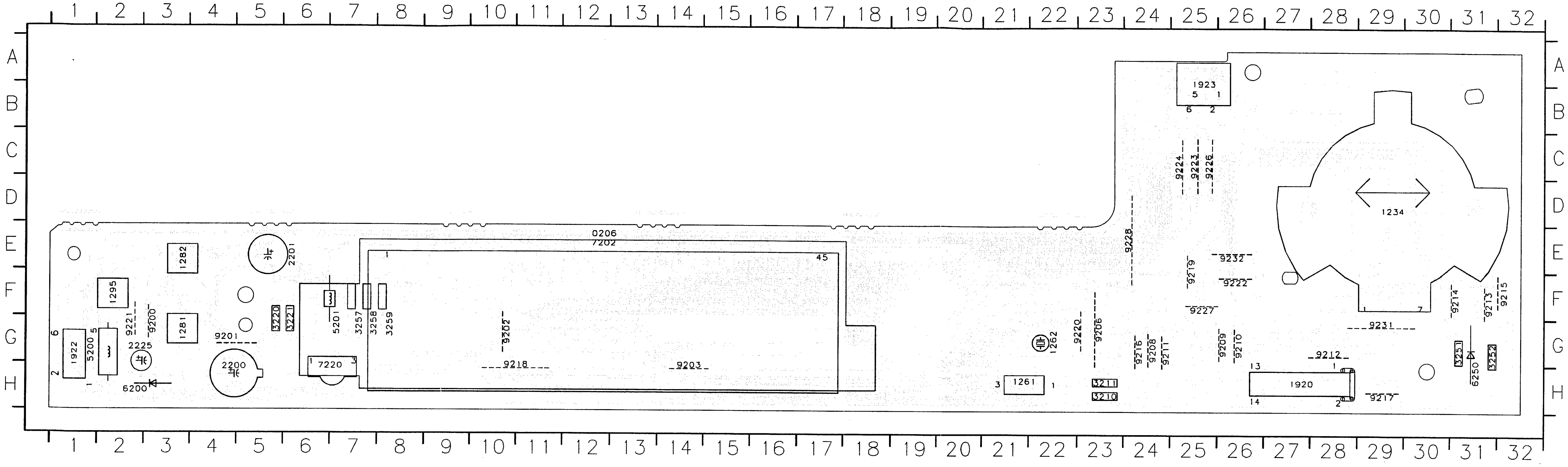
Interconnections Manual Page

PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	

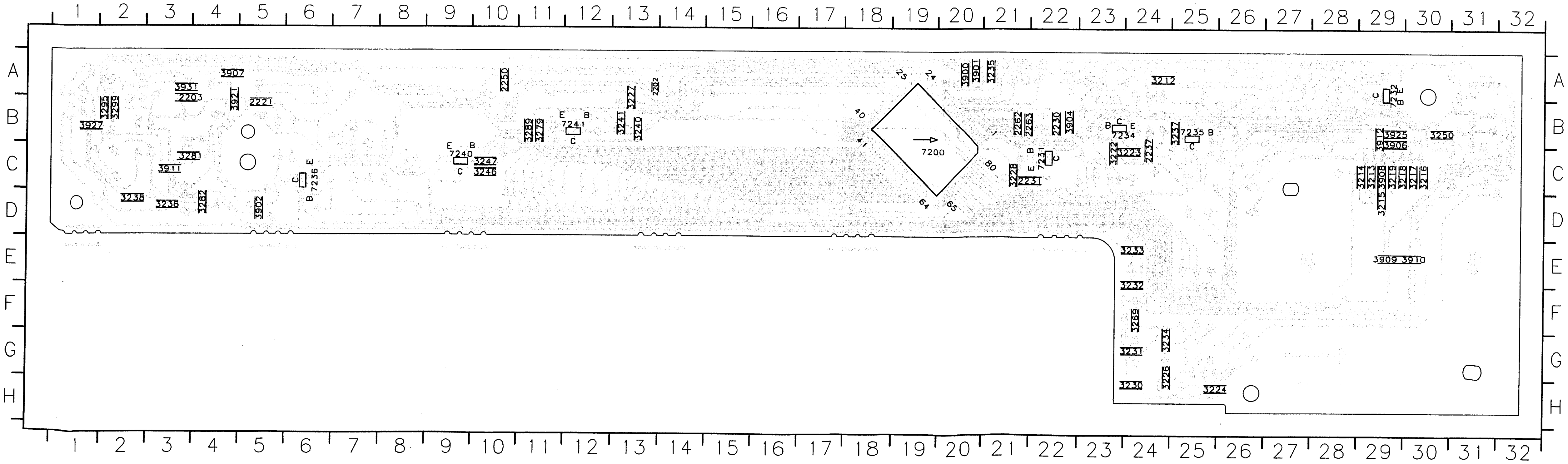

1
2
3
4
5
6
7
8
A
B
C
D
E
F
VBS from I_0
2836 1u
I889
3841 33K
3842 33K
3839 10M
5VASW
I888
I887
0V
8
9
3845 33K
2834 180p
2832 2n2
GNDFO
LM339N
7830-C
14
3838 2K2
3837 2K2
5VASW
3835 4K7
1,6V
2,6V
BC847B
7831
2,9V
2V
I884
3836 4K7
7832
BC847B
I885
1,7V
VFV from FV
2837 1u
I892
3843 33K
3844 33K
3840 10M
10
11
13
LM339N
7830-D
3846 33K
2835 180p
2833 2n2
3834 4K7
3832 22K
3830 4K7
2830 100n
GNDFO
1,9V
7830-A
LM339N
5
3
4
2
12
FOME to AI02
I882
I881
2831 10u
3831 100K
3833 15K
I890
GNDFO
7830-B
LM339N
7
6
1
5871 10U
5872
BLM21
2878 100n
GNDFF
I030
2872 100n
2877 47u
GNDFF
7871
STV5348
I038
STTV
FFB
MA_ISL
POL
L23
VDDD
VDDA
5
6
2
4
18
22
3
47K 3871
I031
1 CVBS
2873 100n
2874 100n
I032
28 CBLK
I033
21 VCR_ITV
CLAMPING
SYNCHRONIZING
DATA EXTRACTION
Data
Clock
DATA DECODING
DATA
PROCESSING
DV_
19
I039
3872 47K
TEST1
20
I040
3873 47K
TEST2
27
Data
Address
CTRL
8 PAGES
MEMORY
2875 22p
2876 22p
I034
I035
1871
HC-49/U
13M875
24 XTI
23 XTO
OSCILLATOR
FREQUENCY
SYNTHETISER
TIME BASE
25 VSSO
BLAN 12
R 8
G 9
B 10
Y 15
DISPLAY
INTERFACE
SCL from AI01
3874 100R
I036
16 SCL
SDA from AI01
3875 100R
I037
17 SDA
I2C BUS
INTERFACE
VSSD
VSSA
RGBREF
ODD_IEVEN
COR_
7
26
11
14
13
3876 10K
GNDFF
5VASW
3091 4K7
3092 4K7
3093 10K
3094 10K
3090 10K
✳
PSS to FV
SFS to IO,FV
SB1 from FV
ISMC to IO
PBV to VS_SEC
CNR to CNR
CSI to VS_SEC
CAGC to VS
I014
I013
I015
✳7092
PDTC124ET
GNDVS
5VD
2099 100n
GNDCNR
15
16
E0
VDD
7091
HEF4094BT
O2
O1
O0
O4
O6
O5
O7
O3
CP
D
STR
Os
Os'
VSS
6
5
4
14
12
13
11
7
3
2
1
9
10
8
I010
3095 100R
SRCLK from AI02
I011
3096 100R
ODAT from AI01
I012
3097 100R
STROBE from AI02
✳ ....for mstd only
5VASW
GNDCNR
GNDVS
C802
I891
GNDA
GNDFO
from PS

1871	E1
2099	C8
2830	A6
2831	B4
2832	A2
2833	C2
2834	A2
2835	C2
2836	A1
2837	B1
2872	C4
2873	D1
2874	D1
2875	E1
2876	E1
2877	C4
2878	C3
3090	C7
3091	C6
3092	C6
3093	C6
3094	C7
3095	C8
3096	D8
3097	D8
3830	A5
3831	B5
3832	A5
3833	C5
3834	A4
3835	A3
3836	B3
3837	A3
3838	A3
3839	A2
3840	B2
3841	A2
3842	A2
3843	B1
3844	B1
3845	A1
3846	C1
3871	D5
3872	D5
3873	D5
3874	F1
3875	F1
3876	F3
5871	C4
5872	C3
7091	C7
7092	D6
7830-A	B5
7830-B	A7
7830-C	A3
7830-D	B3
7831	A4
7832	B4
7871	D1
C802	F8
I010	C8
I011	D8
I012	D8
I013	D6
I014	C6
I015	E6
I030	C4
I031	D1
I032	D1
I033	D1
I034	E1
I035	E1
I036	F1
I037	F1
I038	C2
I039	D4
I040	D4
I881	B5
I882	B4
I884	B3
I885	B3
I887	A2
I888	A2
I889	A1
I890	C4
I891	F8
I892	B1

Display Control ADCP18 (DC)


1923
1234
0206
7202
1282
1295
1281
1922
5200
2225
6200
2200
2201
9200
9221
9201
3220
3221
5201
3257
3258
3259
7220
9202
9218
9203
1262
9220
9206
1261
3211
3210
9228
9224
9223
9226
9219
9232
9222
9227
9216
9208
9211
9209
9210
9231
9212
1920
9217
9214
9213
9215
3251
3252
6250

0206	E12
1234	D29
1261	H21
1262	G22
1281	G3
1282	E3
1295	F2
1920	H27
1922	G1
1923	A25
2200	H4
2201	E6
2225	G2
3210	H23
3211	H23
3220	G5
3221	G6
3251	G31
3252	G31
3257	G7
3258	G7
3259	G8
5200	G1
5201	G7
6200	H2
6250	H31
7202	E12
7220	H7
9200	G3
9201	G4
9202	G10
9203	H14
9206	G23
9208	G24
9209	G26
9210	G26
9211	G24
9212	G28
9213	F31
9214	F31
9215	F32
9216	G24
9217	H29
9218	H10
9219	E25
9220	G22
9221	G2
9222	F26
9223	C25
9224	C25
9226	C25
9227	F25
9228	E24
9231	G29
9232	E26

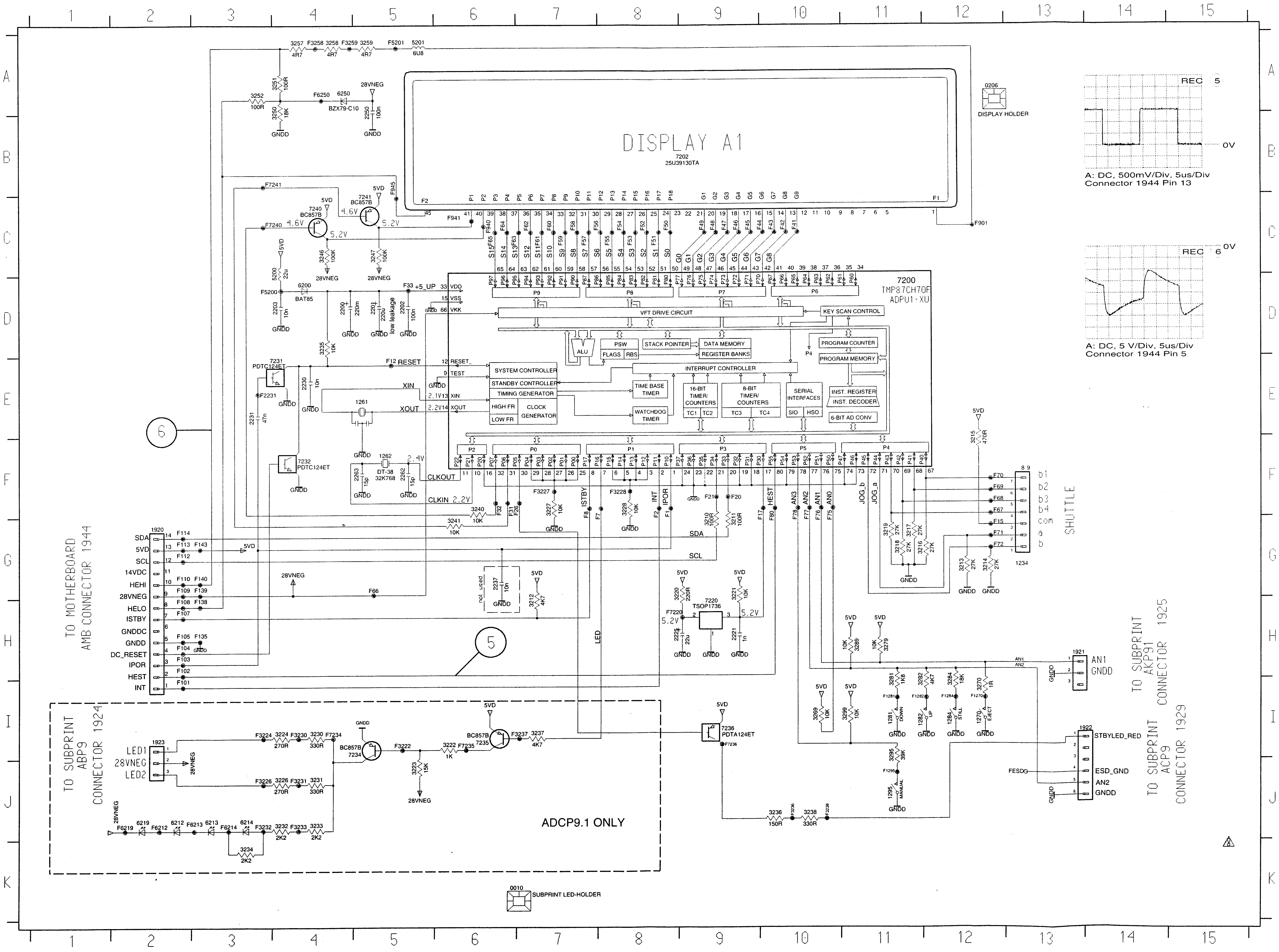

3907
3931
2203
3921
2221
3295
3299
3927
3281
3911
3238
3236
3282
3902
7236
2250
7240
3247
3246
3289
3279
7241
3241
3240
3227
2202
3900
3901
3235
7200
2262
2263
2230
3904
7231
3228
2231
3212
7234
3222
3223
2237
7235
3237
7232
3925
3906
3250
3214
3213
3215
3908
3219
3218
3217
3216
3909
3910
3233
3232
3269
3231
3226
3230
3224

2202	A13
2203	B3
2221	B5
2230	B22
2231	C21
2237	C24
2250	A10
2262	B21
2263	B21
3212	A24
3213	C29
3214	C29
3215	D29
3216	C30
3217	C30
3218	C29
3219	C29
3222	C23
3223	C24
3224	H25
3226	G24
3227	B13
3228	C21
3230	H24
3231	G24
3232	E24
3233	E24
3235	A21
3236	D3
3237	B25
3238	D2
3240	B13
3241	B13
3246	C10
3247	C10
3250	B30
3269	F24
3279	B11
3281	C3
3282	D4
3289	B11
3295	B2
3299	B2
3900	A20
3901	A20
3902	D5
3904	B22
3906	B29
3907	A4
3908	C29
3909	E29
3910	E30
3911	C3
3912	B29
3921	B4
3925	B29
3927	B1
3931	A3
7200	C19
7231	C22
7232	A29
7234	B23
7235	B25
7236	C6
7240	C9
7241	B12

Display Control ADCP18 (DC)

Interconnections Manual Page

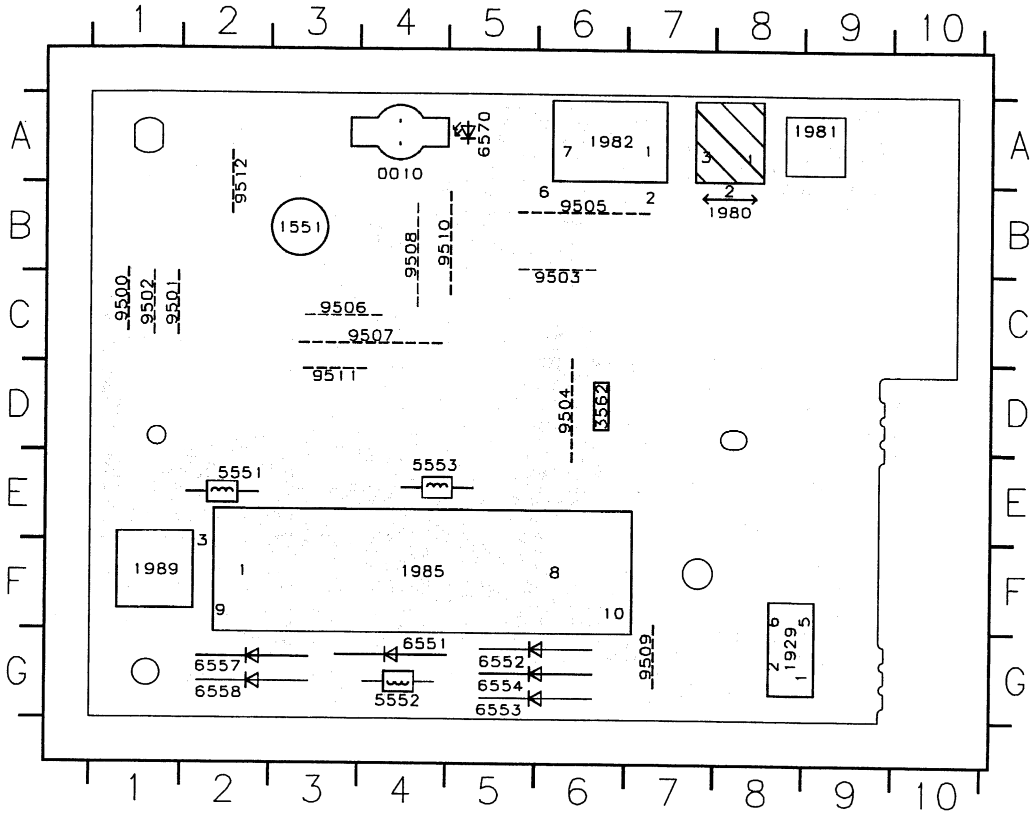
PS 3-18	FM-STEREO-TDA 3-22	AF 3-24	AL 3-26	HA 3-30	CNR 3-34	AIO1 3-36	DE 3-39	VPS; FOME; PE 3-42
FV 3-20	FM-STEREO-MSP 3-23	ER 3-25	VS 3-29	VS-SEC 3-33	IO 3-35	AIO2 3-40	VPO 3-41	


DISPLAY A1
7202
25U39130TA
0206
DISPLAY HOLDER
REC 5
0V
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13
REC 6
0V
A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5
7200
TMP87CH70F
ADPU1-XU
VFT DRIVE CIRCUIT
KEY SCAN CONTROL
ALU
PSW
FLAGS
RBS
STACK POINTER
DATA MEMORY
REGISTER BANKS
PROGRAM COUNTER
PROGRAM MEMORY
INTERRUPT CONTROLLER
SYSTEM CONTROLLER
STANDBY CONTROLLER
TIMING GENERATOR
HIGH FR
LOW FR
CLOCK GENERATOR
TIME BASE TIMER
WATCHDOG TIMER
16-BIT TIMER/COUNTERS
TC1 TC2
8-BIT TIMER/COUNTERS
TC3 TC4
SERIAL INTERFACES
SIO HSO
INST. REGISTER
INST. DECODER
6-BIT AD CONV
P0 P1 P2 P3 P4 P5 P6 P7 P8 P9
RESET
TEST
XIN
XOUT
CLKOUT
CLKIN 2.2V
+5_UP
VDD
VSS
VKK
low leakage
7231
PDTC124ET
7232
PDTC124ET
7240
BC857B
7241
BC857B
4.6V
5.2V
1261
1262
DT-38
32K768
6200
BAT85
6250
BZX79-C10
28VNEG
5VD
GNDD
1920
SDA
5VD
SCL
14VDC
HEHI
28VNEG
HELO
ISTBY
GNDDC
GNDD
DC_RESET
IPOR
HEST
INT
TO MOTHERBOARD
AMB CONNECTOR 1944
SHUTTLE
b1 b2 b3 b4 com a b
1234
JOG_b
JOG_a
AN3 AN2 AN1 AN0
7220
TSOP1736
1921
AN1
GNDD
TO SUBPRINT
AKP91
CONNECTOR 1925
1922
STBYLED_RED
ESD_GND
AN2
GNDD
FESD
TO SUBPRINT
ACP9
CONNECTOR 1929
1281 DOWN
1282 UP
1284 STILL
1270 EJECT
1295 MANUAL
7236
PDTA124ET
1923
LED1
28VNEG
LED2
TO SUBPRINT
ABP9
CONNECTOR 1924
7234
BC857B
7235
BC857B
ADCP9.1 ONLY
0010
SUBPRINT LED-HOLDER
not_used
LED
5
6
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H I J K

F1	F8
F2	F8
F7	F8
F8	F7
F12	E5
F15	G12
F17	F10
F20	F9
F21	F9
F26	F7
F31	F6
F32	F6
F33	D5
F41	C10
F42	C10
F43	C10
F44	C10
F45	C9
F46	C9
F47	C9
F48	C9
F49	C9
F50	C8
F51	C8
F52	C8
F53	C8
F54	C8
F55	C8
F56	C7
F57	C7
F58	C7
F59	C7
F60	C7
F61	C7
F62	C7
F63	C6
F64	C6
F65	C6
F66	G5
F67	F12
F68	F12
F69	F12
F70	F12
F71	G12
F72	G12
F75	F10
F76	F10
F77	F10
F78	F10
F80	F10
0010	K6
0206	A12
1234	G13
1261	E5
1262	F5
1270	I12
1281	I11
1282	I11
1284	I12
1295	J11
1920	G2
1921	H13
1922	I13
1923	I2
2200	D4
2201	D5
2202	D5
2203	D4
2221	H9
2225	H8
2230	E4
2231	E3
2237	G6
2250	A5
2262	F5
2263	F5
3210	G9
3211	G9
3212	H7
3213	G12
3214	G12
3215	F12
3216	G11
3217	G11
3218	G11
3219	G11
3220	G8
3221	G9
3222	I6
3223	J5
3224	I4
3226	J4
3227	F7
3228	F8
3230	I4
3231	J4
3232	J4
3233	J4
3234	K3
3235	D4
3236	J10
3237	I7
3238	J10
3240	F6
3241	G6
3246	C4
3247	C5
3250	A4
3251	A4
3252	A3
3257	A4
3258	A4
3259	A5
3269	I10
3270	I12
3279	H11
3281	I11
3282	I11
3284	I12
3289	H11
3295	I11
3299	I11
5200	C4
5201	A5
6200	D4
6212	J2
6213	J3
6214	J3
6219	J2
6250	A4
7200	D11
7202	B9
7220	H9
7231	E3
7232	F4
7234	I5
7235	I6
7236	I9
7240	C4
7241	B5
F101	I2
F102	H2
F103	H2
F104	H2
F105	H2
F107	H2
F108	H2
F109	G2
F110	G2
F112	G2
F113	G2
F114	G2
F1270	I12
F1281	I11
F1282	I11
F1284	I12
F1295	J11
F135	H3
F138	H3
F139	G3
F140	G3
F143	G3
F2231	E3
F3222	I5
F3224	I3
F3226	J3
F3227	F7
F3228	F8
F3230	I4
F3231	J4
F3232	J3
F3233	J4
F3236	J10
F3237	I7
F3238	J10
F3258	A4
F3259	A4
F5200	D3
F5201	A5
F6212	J2
F6213	J3
F6214	J3
F6219	J2
F6250	A4
F7220	H8
F7234	I4
F7235	I6
F7236	I9
F7240	C4
F7241	B4
F901	C12
F940	C6
F941	C6
F945	B5
FESD	J13

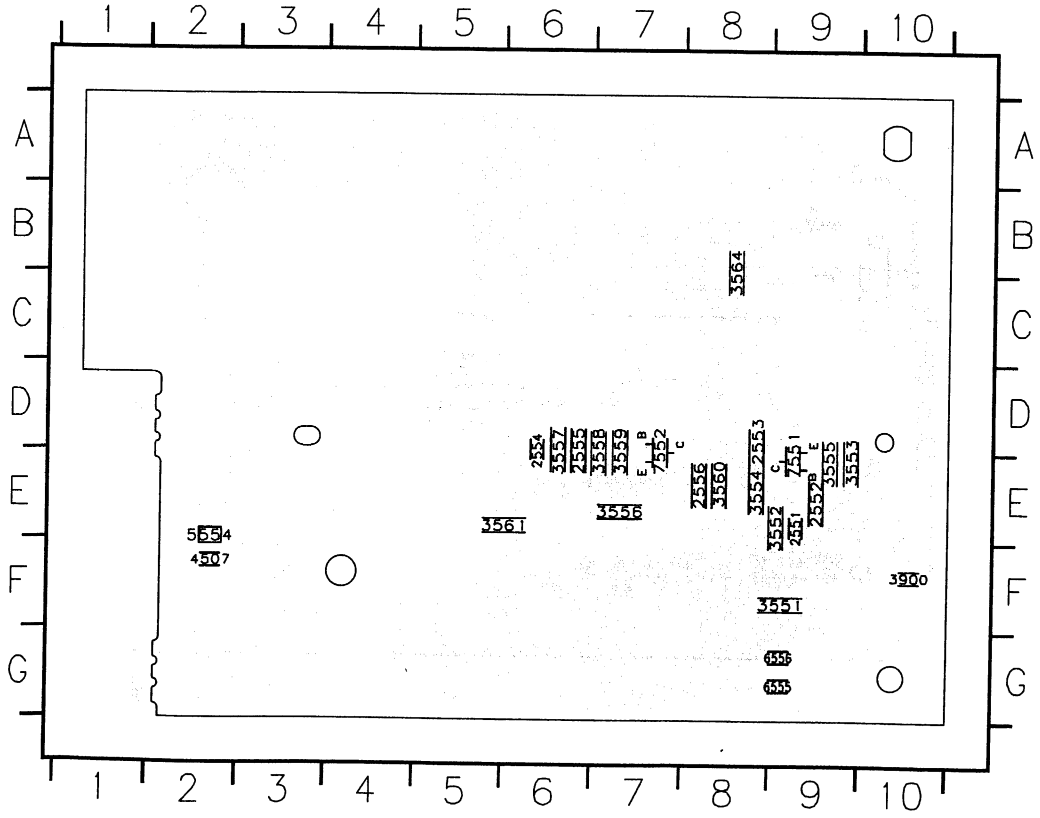
Connector PCB ACP18

0010	A4
1551	B3
1929	G8
1980	A8
1981	A8
1982	A6
1985	F4
1989	F1
3562	D6
5551	E2
5552	G4
5553	E4
6551	G4
6552	G5
6553	G5
6554	G5
6557	G2
6558	G2
6570	A4
9500	C1
9501	C1
9502	C1
9503	C6
9504	D6
9505	B6
9506	C3
9507	C4
9508	B4
9509	G7
9510	B4
9511	D3
9512	A2



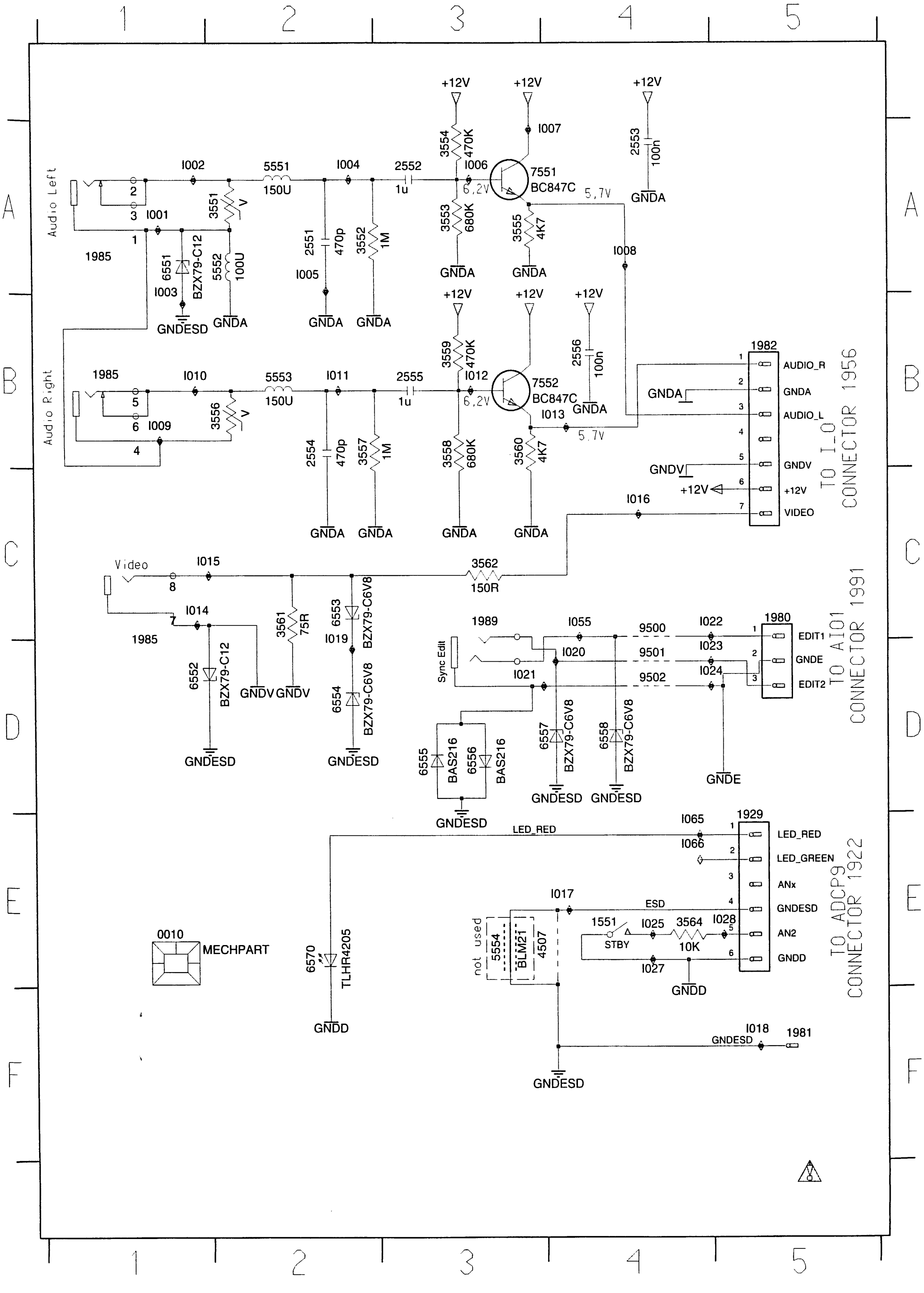
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
0010
6570
1982
7
1
1981
1980
3
1
2
9512
1551
9505
6
2
9508
9510
9503
9500
9502
9501
9506
9507
9511
9504
3562
5551
5553
1989
1985
3
1
8
9
10
9509
1929
6551
6557
6558
5552
6552
6554
6553

2551	E9
2552	E9
2553	D8
2554	D6
2555	D6
2556	E8
3551	F9
3552	E9
3553	E9
3554	E8
3555	E9
3556	E7
3557	D6
3558	D7
3559	D7
3560	E8
3561	E6
3564	B8
3900	F10
4507	F2
5554	E2
6555	G9
6556	G9
7551	E9
7552	D7



1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
3564
2554
3557
2555
3558
3559
7552
2556
3560
3554
2553
7551
3555
3553
3552
2551
2552
3561
3556
5554
4507
3900
3551
6556
6555

Connector PCB ACP18


1
2
3
4
5
A
B
C
D
E
F
Audio Left
Audio Right
Video
Sync Edit
1985
I001
I002
I003
I004
I005
I006
I007
I008
I009
I010
I011
I012
I013
I014
I015
I016
I017
I018
I019
I020
I021
I022
I023
I024
I025
I027
I028
I055
I065
I066
5551 150U
5552 100U
5553 150U
2551 470p
2552 1u
2553 100n
2554 470p
2555 1u
2556 100n
3551
3552 1M
3553 680K
3554 470K
3555 4K7
3556
3557 1M
3558 680K
3559 470K
3560 4K7
3561 75R
3562 150R
3564 10K
6551 BZX79-C12
6552 BZX79-C12
6553 BZX79-C6V8
6554 BZX79-C6V8
6555 BAS216
6556 BAS216
6557 BZX79-C6V8
6558 BZX79-C6V8
6570 TLHR4205
7551 BC847C
7552 BC847C
6,2V
5,7V
+12V
GNDA
GNDV
GNDE
GNDD
GNDESD
1989
9500
9501
9502
1551 STBY
not used
5554
BLM21
4507
ESD
0010
MECHPART
LED_RED
1982
AUDIO_R
GNDA
AUDIO_L
GNDV
+12V
VIDEO
TO I_O CONNECTOR 1956
1980
EDIT1
GNDE
EDIT2
TO AI01 CONNECTOR 1991
1929
LED_RED
LED_GREEN
ANx
GNDESD
AN2
GNDD
TO ADCP9 CONNECTOR 1922
1981

0010	E1
1551	E4
1929	E5
1980	C5
1981	F5
1982	B5
1985	A1
1985	B1
1985	C1
1989	C3
2551	A2
2552	A3
2553	A4
2554	B2
2555	B3
2556	B4
3551	A2
3552	A2
3553	A3
3554	A3
3555	A3
3556	B2
3557	B2
3558	B3
3559	B3
3560	B3
3561	C2
3562	C3
3564	E4
4507	E3
5551	A2
5552	A2
5553	B2
5554	E3
6551	A1
6552	D1
6553	C2
6554	D2
6555	D3
6556	D3
6557	D4
6558	D4
6570	E2
7551	A3
7552	B3
9500	C4
9501	D4
9502	D4
I001	A1
I002	A1
I003	A1
I004	A2
I005	A2
I006	A3
I007	A4
I008	A4
I009	B1
I010	B1
I011	B2
I012	B3
I013	B4
I014	C1
I015	C1
I016	C4
I017	E4
I018	F5
I019	C2
I020	D4
I021	D3
I022	C4
I023	D4
I024	D4
I025	E4
I027	E4
I028	E5
I055	C4
I065	E4
I066	E4

4. DRIVE ASSEMBLY

This tape deck has three motors; one providing precision drive for the scanner unit; the second providing direct drive for the capstan and belt drive for the reel tables; the third motor drives the lift and tape threading/dethreading operations.

Special features are:

Quick start
Short winding time
Automatic cleaning of video heads by cleaning roller

To obtain a high repair standard we have developped a range of service kit's. These kit's covers the spare parts which are engaged together.
The tape deck's sensors are located on the motherboard underneath the tape deck, and included in its circuitry, lay out and parts list.

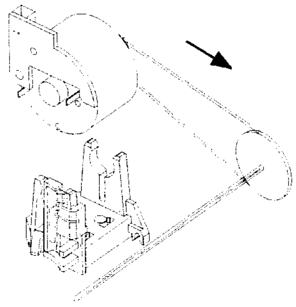
4.1 Deck parts replacement

The procedure for the removal and refitting of the following parts is described; only the lift, the scanner, the capstan motor and the A/C head are fixed by screws.
All the other deck assembly parts are held only by snap hooks.

For the replacement of parts on the underside of the tape deck, remove the tape deck from the motherboard.

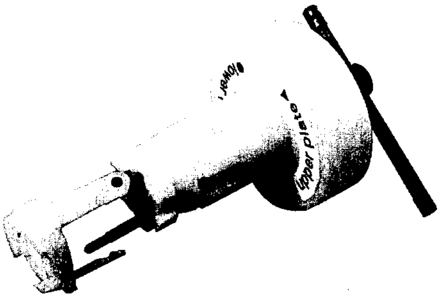
Manual extraction of cassette:
If, after the Eject button has been pressed, the drive does not unthread and eject the cassette, the dethreading/eject operation can also be carried out manually by turning the wheel at the rear of the threading motor.

fig. 1

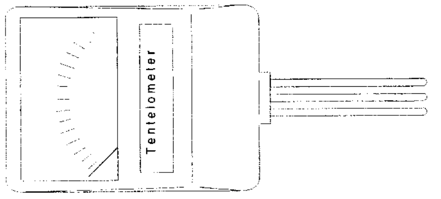


IMPORTANT:
After each repair has been carried out in the drive assembly, the first operation after repairing must be to bring the cassette compartment into „eject“ position by hand.

Auxiliary tools for deck adjustment:

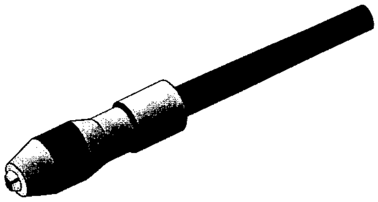


Tool for removing the head disc 4822 395 90977

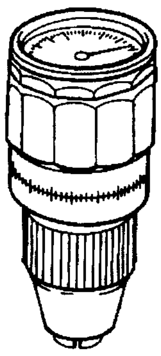


Tentelometer 4822 395 90584

Tool for tapetension adjustment 4822 395 50188

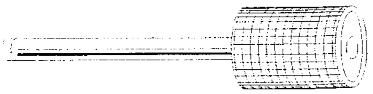


Handle 4822 256 90493



Torquemeter:

600 gf-cm 4822 395 90232
90 gf-cm 4822395 80196



Post adjustment screwdriver 4822 395 50275

Testcassette 4822 397 30103

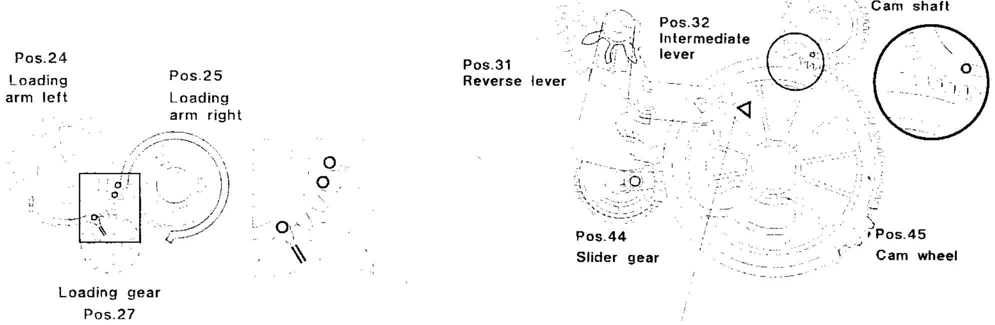
Nylon gloves 5322 395 94022

4.1.1 Deck lay out diagram

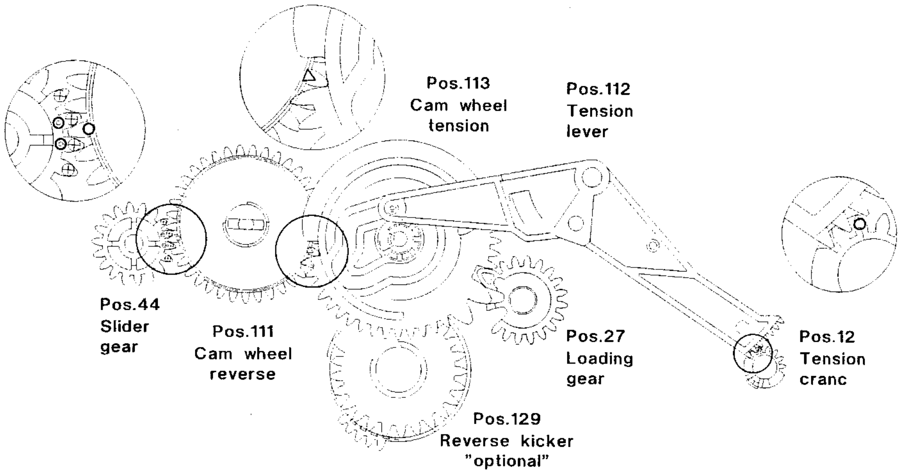
Deck in position „threaded out".

The following diagrams indicate the relative position of the gearwheels and levers when the deck is in the threaded out (cassette-compartment down) position.

Top view


Pos.24
Loading arm left
Pos.25
Loading arm right
Loading gear
Pos.27
Pos.31
Reverse lever
Pos.32
Intermediate lever
Pos.46
Cam shaft
Pos.44
Slider gear
Pos.45
Cam wheel
∇ for full loaded wind

Underside view


Pos.113
Cam wheel tension
Pos.112
Tension lever
Pos.44
Slider gear
Pos.111
Cam wheel reverse
Pos.27
Loading gear
Pos.12
Tension cranc
Pos.129
Reverse kicker
"optional"

4.1.2 The Lift

Refitting the lift compartment:
Ensure the lift compartment is down and gear A is rotated one click stop anticlockwise from the down position.
The removal and refitting of the lift can be carried out in all deck positions with the exception of „eject" (ensure that gears 103/105 are free and if present the cassette loader gear 2 pos.105 is positioned to the rear).

To remove the lift:
Free the holding bracket (Fig. 2) by rotating it up and back from the upper end.
Unscrew the 4 screws on the underside of the deck.
Carefully remove the lift vertically, noting the position of the record protect operating lever.

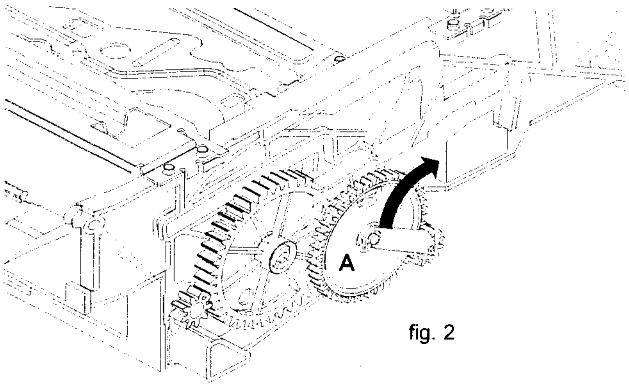


fig. 2

4.1.3 Head disc replacement

Removal :

Nylon gloves should be worn when handling the head disc.
Turn the headdisc until the long hole of the rotor appears in the bigger hole of the scannermotor
Insert the reference pin C (included with each service head disc) through the bigger hole of the lid of the scanner motor until the pin snaps in the long hole of the rotor. (Fig. 3)

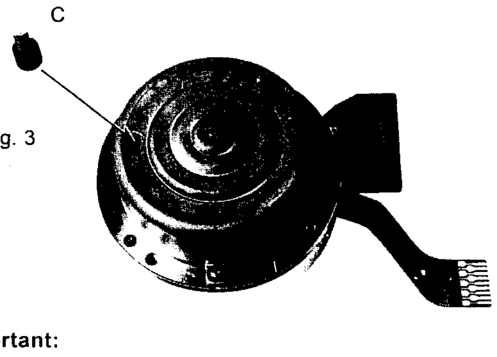


fig. 3

Important:
Choose Installation/Removal of the upper/lower clamping element by turning and attaching the reference element to the tool. (Fig. 4)

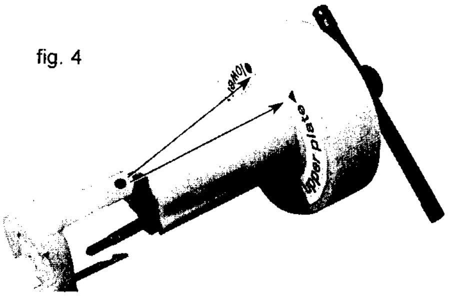
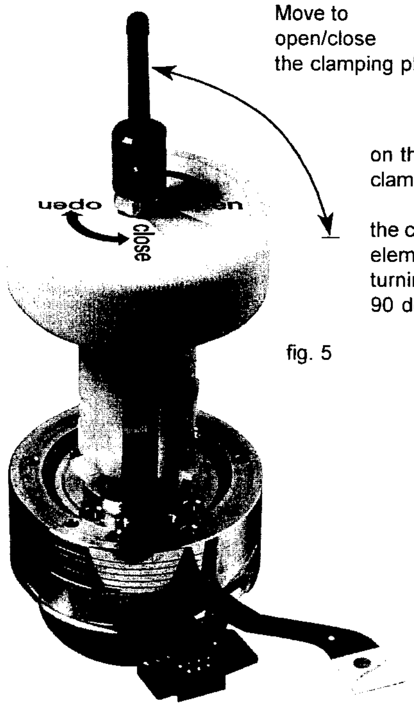

lower
upper plate

fig. 4



Move to open/close the clamping plate

Position the tool on the upper clamping element, loosen the clamping element by turning the lever 90 degrees and remove it from the head disc. (Fig. 5)

fig. 5

Prepare the tool for the lower clamping element.Position the tool on the head disc and make sure that all 3 pins are snapped in the the lower clamping element. Loosen the clamping element by turning the lever 90 degrees and remove the head disc plus the tool from the scanner spindle. (Fig.6)

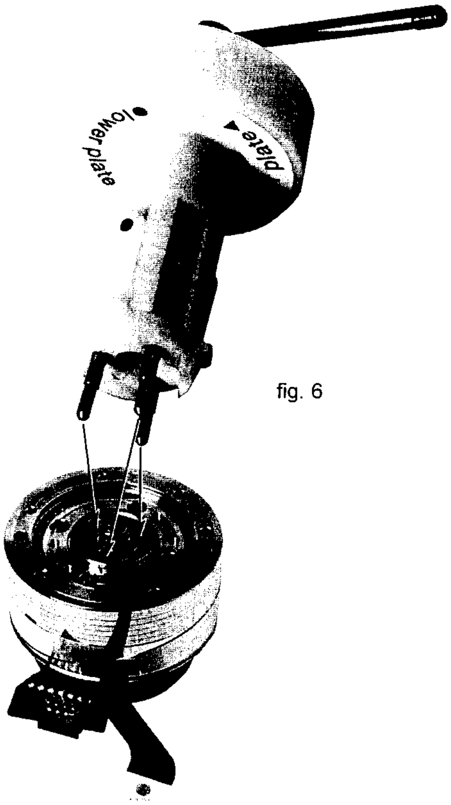


fig. 6

Installation:

Before carrying out the installation of the new head disc make sure that the scanner motor spindle is clean and undamaged. (The spindle has to be free of grease and must not be touched with bare hands)

Insert the 2 Mylar foils (included with each head disc) in the head disc. (Fig.7)

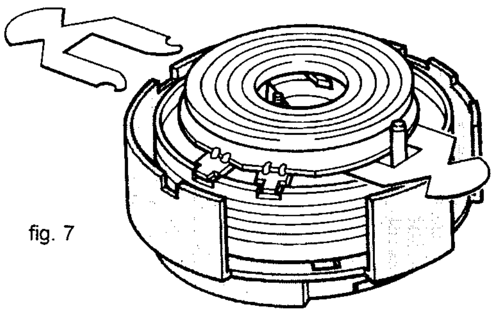


fig. 7

Position the tool (reference: lower clamping element) on the new headdisc (with protective cover) and loosen the lower clamping element.

Position the head disc so that pin D of the protective cover engages in the hole of the stator (the arrow on the protective cover must point towards the scanner print). (Fig. 8)

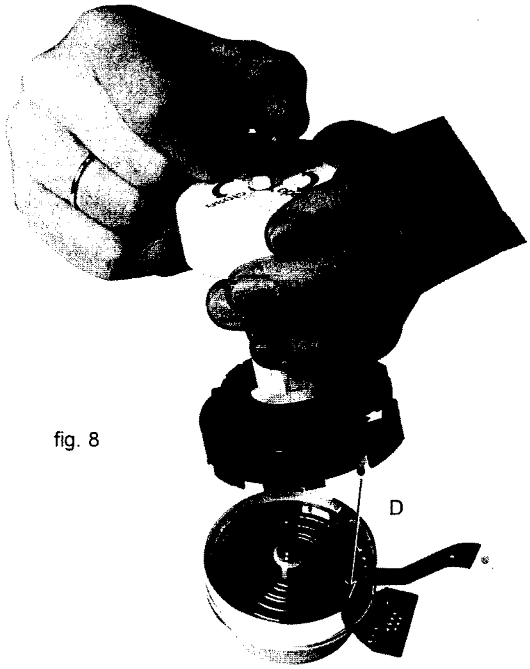


fig. 8

Reach the exact position through pressing the tool down with a force of 1 N. and fix the lower clamping element by turning the lever towards „close".

Remove the tool.

Change the tool to „upper clamping element" and position the clamping element exactly. (Fig. 9)

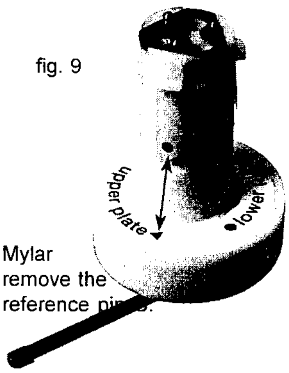


fig. 9

Tighten the clamping element through turning the lever towards „open". Position the tool planely on the head disc and fix the clamping element. (Fig.5 „close") Remove the protecting cap from the head disc, withdraw the two foils and Mylar remove the reference pins.

After replacing the head disc, carry out the following adjustments and checks :

Head switching pulse (gap position, chapter 3)

Write current adjustments (chapter 3)

Check tape path alignment (see paragraph 4.2.1.)

4.1.4 A/C Head (Combi head) (Pos. 36)

Remove the fixing spring (A) (fig. 10)
Remove the fixing screw and replace the A/C head.
Use a new fixing spring (included with new A/Chead) for reassembly.

After the A/C head has been replaced, all adjustments described in paragraph 4.2.1.2 and paragraph 4.2.2 have to be carried out.

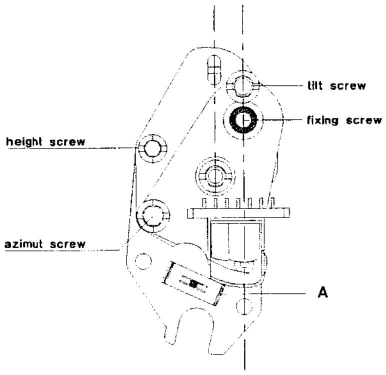


fig. 10

4.1.5 Threading motor (Pos. 38)

Remove the belt and disconnect the connector plug.
Remove the threading motor from the motor supports (Fig. 11).

During reassembly ensure that the threading motor is correctly located in the front and rear supports.

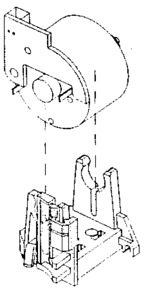


fig. 11

4.1.6 Capstan motor (Pos. 127)

Remove the tape deck.
Remove the belt (pos.126) on the underside;
Remove the three capstan motor fixing screws (Fig. 12) and withdraw the capstan motor downward from the drive assy.
The reassembly is carried out in reverse order. Make sure that the capstan is free of grease.

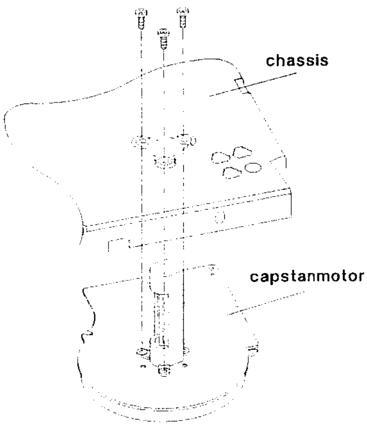


fig. 12

4.1.7 Pressure roller (Pos. 37)

Remove the tape deck
Unhook and remove the pressure roller tension spring.
Release the pressure roller guide (pos. 41) from the guide in the threading motor holder by pressing the top of the motor guide rearwards and rotating the pressure roller guide assembly clockwise by approximately a quarter of a turn (Fig. 13) The pressure roller and guide can now be lifted clear.

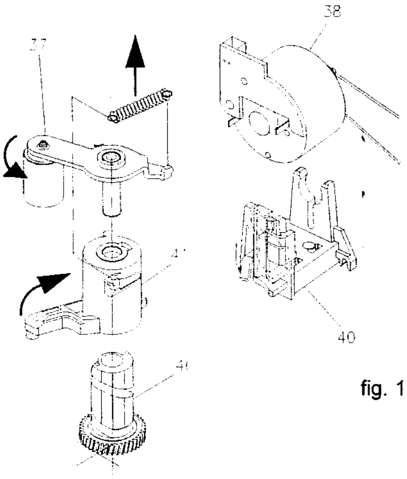
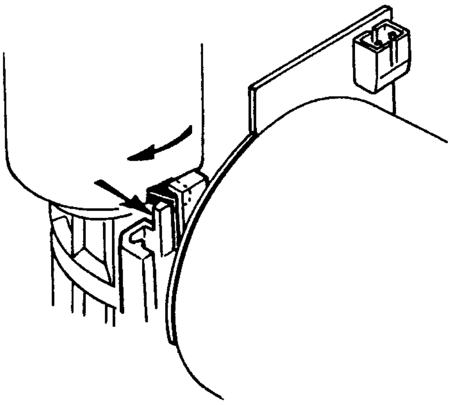


fig. 13



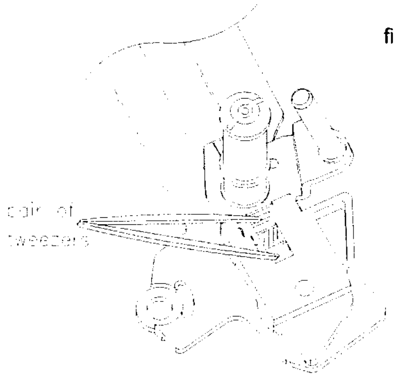
Ensure that no grease from the pressure roller guide gets to the capstan or pressure roller.
The reassembly is carried out in reverse order.

4.1.8 Roller unit right (Pos. 26)

Remove the tape deck.
Compress the two snap hooks by means of a pair of tweezers and remove the roller assy from the roller unit right (Fig. 14).
Unhinge the loading arm right from the holding plate and push the latter towards the front of the deck to remove from the guide (right).

NOTE: During reassembly ensure the link from 25 is engaged in the hole of the holder plate 26.

fig. 14



After replacing the roller unit (right), the tape path has to be checked, and adjusted if necessary (paragraph 4.2.1).

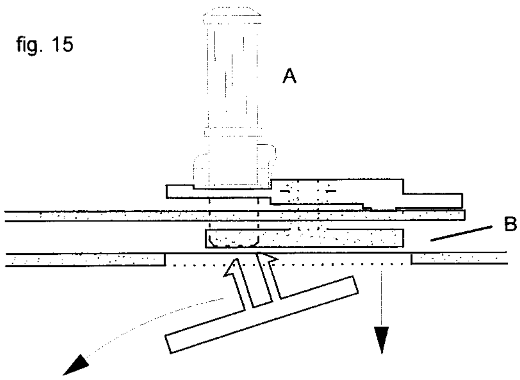
4.1.9 Roller unit left (Pos.23)

Set the drive assy to „Eject" position.
Unhook the tension arm spring (pos. 11), to avoid the tension arm spring being pre-loaded.
At the bottom side of the drive assy remove the tension lever (pos.112).
Compress the two snap hooks by means of a pair of tweezers (Fig. 9)and remove the roller assy (A) from the plate (B).
Unhinge the loading arm (left) from the holding plate and remove the latter downward from the drive assy through the recess in the chassis (Fig. 15).
The reassembly is carried out in reverse order.

NOTE : During reassembly
1. Place the carriage holding plate in the assembly with the half-round cutout nearest the rear of the deck.
2. When the loading arm is refitted ensure the pin on the underside of 23 is through the link of 24B.

After replacing the roller unit (left) the tape path has to be checked (paragraph 4.2.1.), and adjusted if necessary.

fig. 15

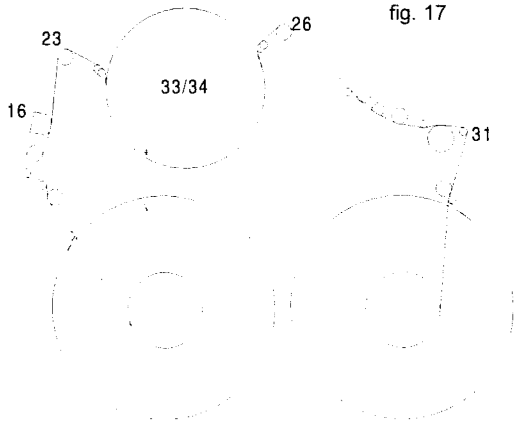


4.2 Adjustments

Adjustments must not be made in the service position.

4.2.1 Tape path

fig. 17


23
26
33/34
16
31

4.2.1.1 Roller left unit/roller unit right

Preparation:
Connect one input of a dual trace oscilloscope to observe the tape sync pulse CTL. The other input (DC coupled) to observe the tracking information TRIV.
Trigger the oscilloscope externally on the head pulse HP1 ("SWIN").

Playback the black and white section of the alignment test tape.
Set the deck in the condition where the video heads are running along the upper edge of the tracks only by:
1. Call the service test program (chapter 2.1)
2. Activate manual tracking (service test program step 03) and watch the tape sync pulse move to the left in relation to the TRIV signal.
3. Note the extreme left hand position reached by the sync pulse, repeat as necessary.
4. Stop the movement of the pulse when the TRIV signal reduces to 1/2 to 2/3 maximum amplitude by pressing the normal play button. A noisy picture (disturbances) is visible on the TV set and the CTL pulse should be to the left of the display.
The recorder will hold this position until the service test progam step 03 is left.
This condition works only if X-distance is adjusted.

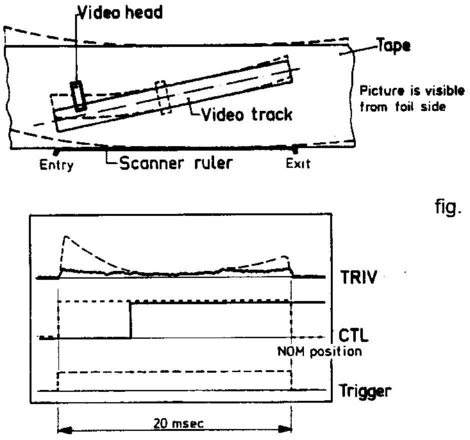

Video head
Tape
Picture is visible from foil side
Video track
Entry
Scanner ruler
Exit
TRIV
CTL
NOM position
Trigger
20 msec

fig. 18

Adjustment:
Adjust the left and right roller units to make the tracking signal TRIV straight and flat as possible (Fig. 18).

4.2.1.2 A/C Combi head

Tilt angle adjustment

Set the drive to feature mode (e.g. +7)
Adjustment :

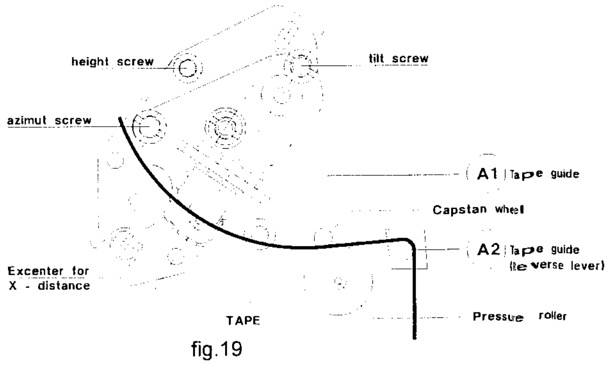

height screw
tilt screw
azimut screw
A1 Tape guide
Capstan wheel
A2 Tape guide
(reverse lever)
Excenter for X - distance
TAPE
Pressure roller

fig.19

By means of the tilt angle adjusting screw move the tape until the lower edge just touches the tape guide A1 (see Fig. 19) the tape must not be distorted at the lower edge (by pressing onto guide).

Adjustment of the azimuth angle and the head height

Connect an oscilloscope to the linear Audio output.
Play the section of the test cassette with the audio signal 400 Hz.
Adjust for maximum output voltage by means of the height adjustment screw
Play the section of the test cassette with the audio signal 8 kHz.
Adjust to maximum output voltage by means of the azimuth adjustment screw (Fig. 19).
If necessary, repeat this procedure
Check the tilt angle adjustment

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, it is possible, that the adjustments described in paragraph 4.2.1.1 and paragraph 4.2.1.2 have to be repeated several times.

4.2.2 Adjustment of the horizontal distance (x-distance)

Before this adjustment is carried out, insert the test cassette (start from Eject position). Call the service test program (tracking value will take up its nominal position) and press the „play" button. Playback the black/white part of the test cassette.)

Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the excentric screw (Fig.19).

4.2.3 Brake band and tape tension

Due to further development it is no longer necessary to make theseadjustments after replacement of the brake band.
If the brake band or tape tension are completely misadjusted, set them to a center position; set the drive to „play" and adjust the brake band until the edge of the elbow of the tape tension arm is aligned with the left inner edge of the left guide (fig. 20).

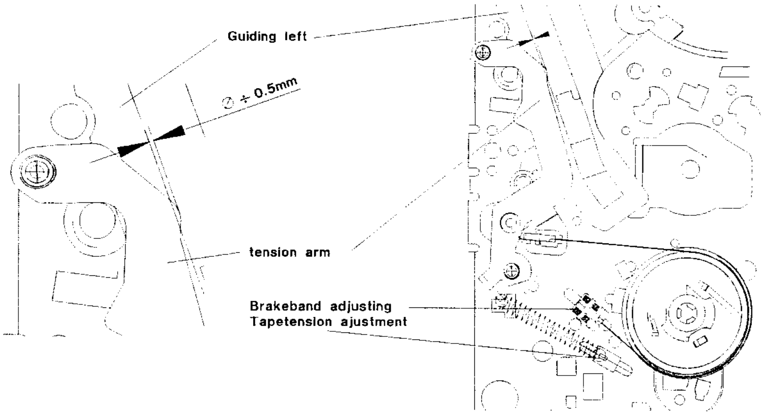
4.2.4 Friction clutch control check

Set the drive to „Play" position.
Place the torquemeter on the right reel.
Turn the capstan motor to move the right reel clockwise.
Keep turning, until the indication at the torquemeter no longer changes (Fig. 21)
The torque has to be 10,5 mNm +/-25% (105gFcm +/-25%)

4.2.5 Reverse brake control

Set the drive to „Reverse" position.
Place a torquemeter on the right reel and turn the latter counterclockwise, until the reel just starts to flip.
The value indicated at the torquemeter has to be 7mNm +/-3mNm (70 gFcm +/-30gFcm) (Fig. 21).

fig. 20



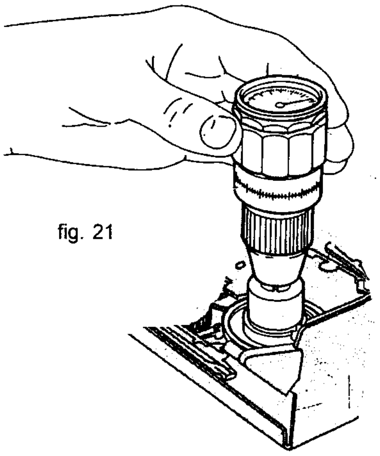
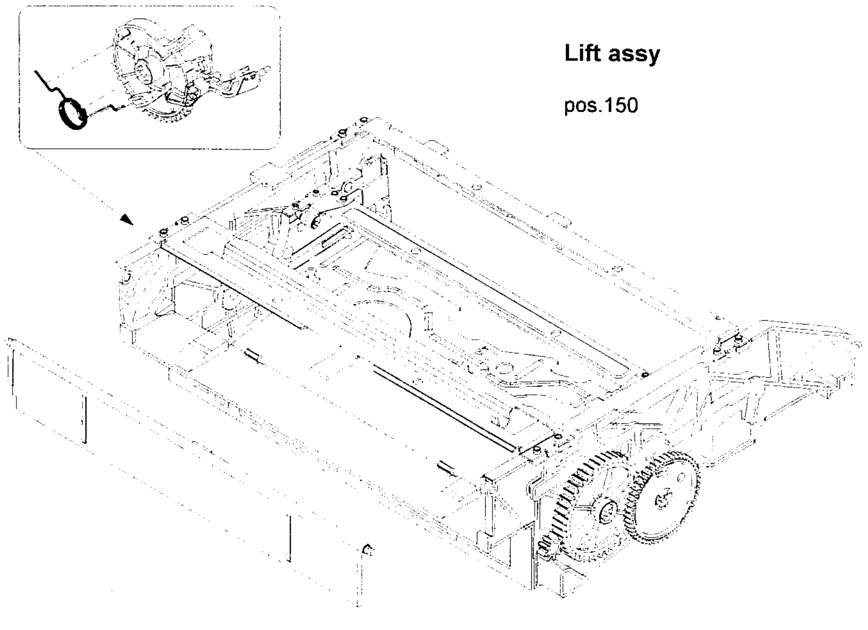


fig. 21

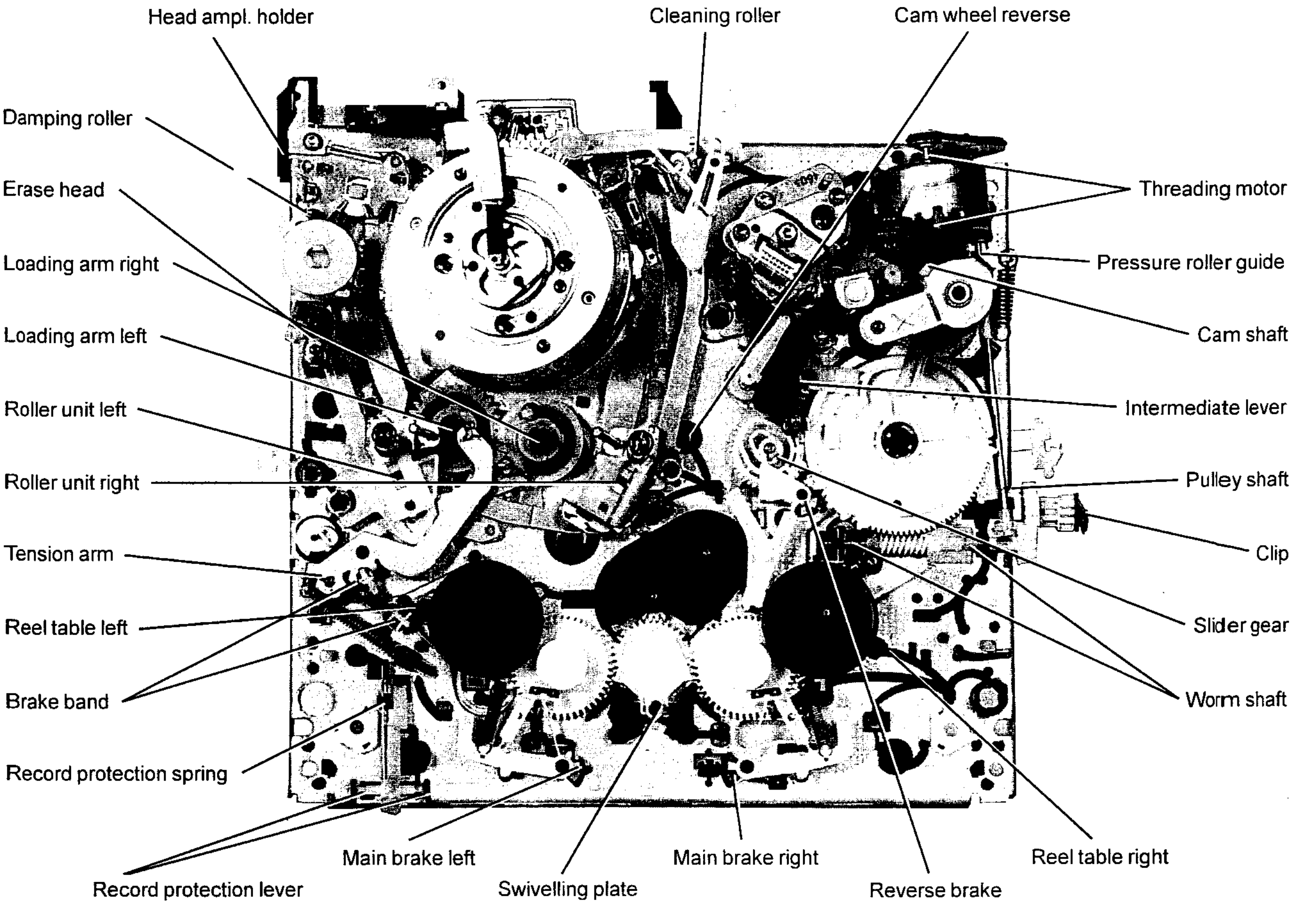
Lift assy

pos.150

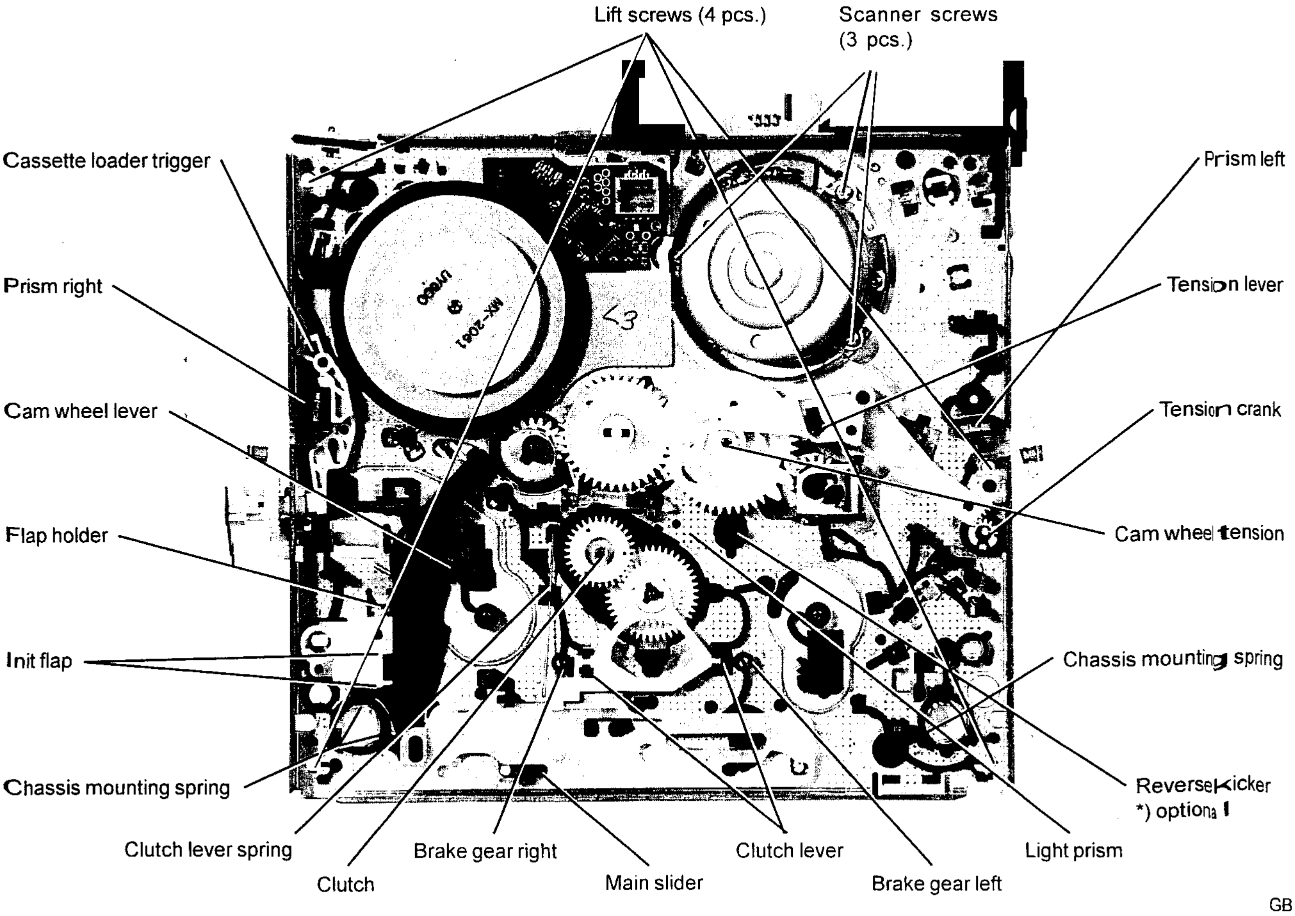


In order to make the replacement of the deck parts easier, the snap hooks are marked with an arrow.

TOP VIEW


Head ampl. holder
Cleaning roller
Cam wheel reverse
Damping roller
Erase head
Loading arm right
Loading arm left
Roller unit left
Roller unit right
Tension arm
Reel table left
Brake band
Record protection spring
Threading motor
Pressure roller guide
Cam shaft
Intermediate lever
Pulley shaft
Clip
Slider gear
Worm shaft
Main brake left
Main brake right
Reel table right
Record protection lever
Swivelling plate
Reverse brake

UNDERSIDE VIEW


Lift screws (4 pcs.)
Scanner screws
(3 pcs.)
Cassette loader trigger
Prism left
Prism right
Tension lever
Cam wheel lever
Tension crank
Flap holder
Cam wheel tension
Init flap
Chassis mounting spring
Chassis mounting spring
Reverse kicker
*) optional
Clutch lever spring
Brake gear right
Clutch lever
Light prism
Clutch
Main slider
Brake gear left

4.3 Exploded view

Top view

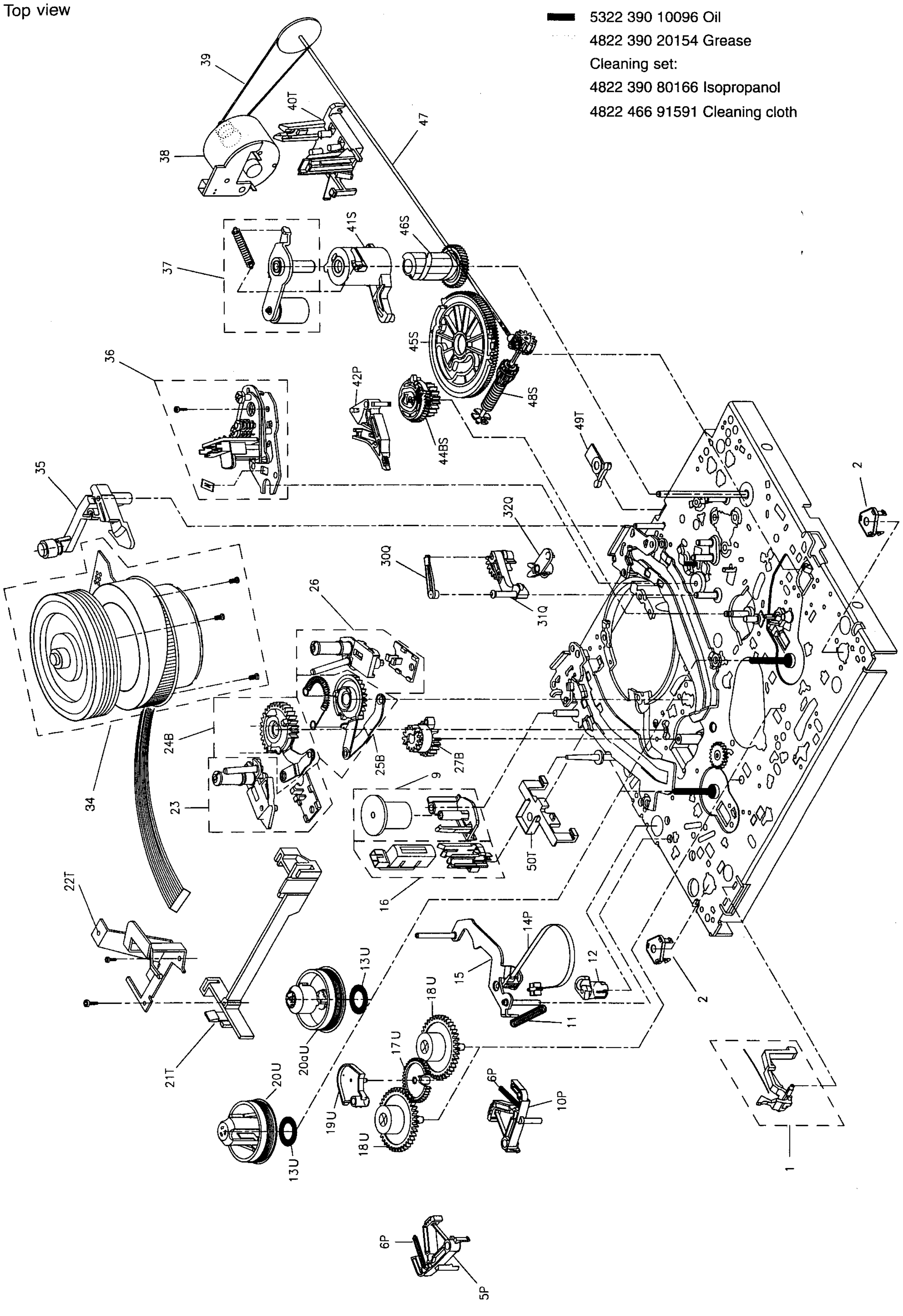
▬ 5322 390 10096 Oil

····· 4822 390 20154 Grease

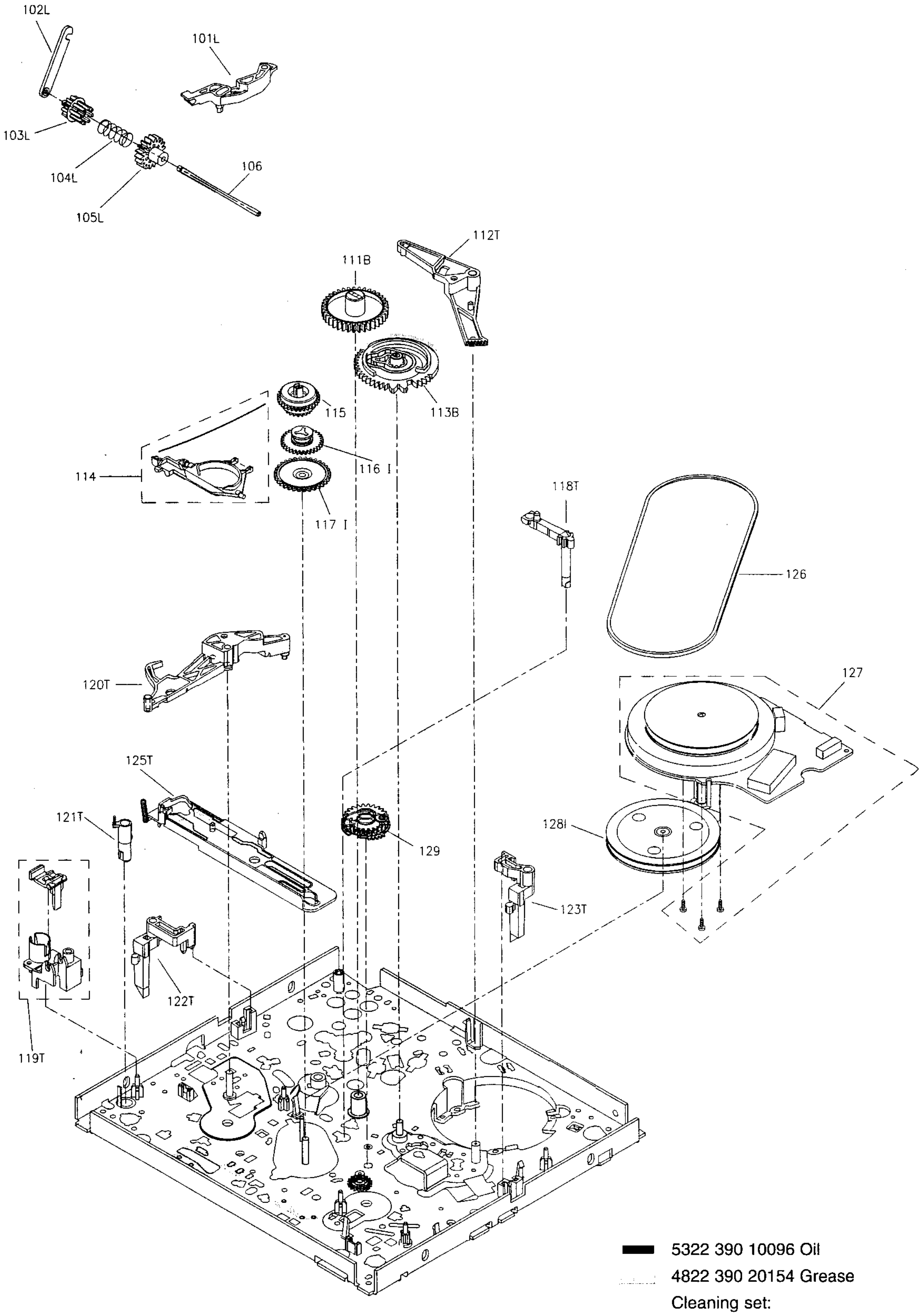
Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth


39
40T
47
38
37
41S
46S
45S
48S
36
42P
44BS
49T
2
35
32Q
30Q
31Q
26
34
24B
25B
27B
23
9
16
50T
22T
14P
15
12
11
2
13U
20aU
18U
17U
21T
20U
19U
6P
10P
18U
13U
1
6P
5P

Underside view


102L
101L
103L
104L
106
105L
112T
111B
113B
115
116 I
114
117 I
118T
126
127
120T
125T
121T
129
128I
123T
122T
119T

▬ 5322 390 10096 Oil

⋯ 4822 390 20154 Grease

Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth

4.4 MECHANICAL PARTS LIST

Pos.	Description	KITS B	I	L	P	Q	S	T	U	Code number 4822
1	Rec. protection lever (with spring)									402 10202
2	Chassis mounting spring (2x)									492 71022
5	Main brake left				P					
6	Main brake spring (2x)				P					
9	Damping roller *)									528 70782
10	Main brake right				P					
11	Tension arm spring									492 33317
12	Tension crank									403 70551
13	Slip ring								U	
14	Tension band				P					
15	Tension arm									403 70547
16	Erase head									249 10522
17	Swivelling gear								U	
18	Brake gear (2x)								U	
19	Swivelling plate								U	
20	Reel table (S)								U	
20a	Reel table (T)								U	
21	Headamplifier holder							T		
22	Bracket							T		
23	Roller unit left									528 70771
24	Loading arm left	B								
25	Loading arm right	B								
26	Roller unit right									528 70772
27	Loading gear	B								
30	Reverse clip					Q				
31	Reverse lever					Q				
32	Intermediate lever					Q				
34	Scanner assy. 4/2 (Head disc and motor)									**4822** 218 12032
35	Cleaning roller									528 70773
36	A/C Head (with clip and screws)									249 10468
37	Pressure roller (with spring)									528 70774
38	Threading motor									361 10809
39	Threading belt									358 20421
40	Motor holder							T		
41	Pressure roller guide						S			
42	Reverse brake				P					
44	Slider gear	B					S			
45	Cam wheel						S			
46	Cam shaft						S			
47	Pulley shaft									528 81462
48	Worm shaft						S			
49	Chassis mounting clip							T		
50	WD-holder							T		

Pos.	Description	KITS B	I	L	P	Q	S	T	U	Code number 4822
101	Cassette loader trigger			L						
102	Clip			L						
103	Cassette loader gear1			L						
104	Cassette loader spring			L						
105	Cassette loader gear2			L						
106	Spindle									535 93277
111	Cam wheel reverse	B								
112	Tension lever							T		
113	Cam wheel tension	B								
114	Clutch lever (with spring)									403 70549
115	Clutch									528 20736
116	Changing gear		I							
117	Double gear		I							
118	Light prism							T		
119	Init flap and holder							T		
120	Cam wheel lever							T		
121	S-VHS lever							T		
122	Prism rihgt							T		
123	Prism left							T		
125	Main slider							T		
126	Driving belt									358 31166
127	Capstan motor (with screws)									361 10805
129	Reverse kicker with transmission gears *)									522 20451
128	Gear pulley		I							
150	Lift									443 64112
KIT	B									310 31955
KIT	I									310 31963
KIT	L									310 32116
KIT	P									310 32191
KIT	Q									310 10658
KIT	S									310 10661
KIT	T									310 10662
KIT	U							3103		109 09190

*) optional

Um eine hohen Reparaturstandard zu gewährleisten sind mit Ausnahme von Kit T immer alle im Kit enthaltenen Teile zu tauschen.

In order to guarantee a high repairstandard all spare parts included in a kit have to be replaced with the exception of kit T.

Per una riparazione garantita ocorre sostituire tutti i pezzi contenuti nei kit, fatta eccetione per il kit T.

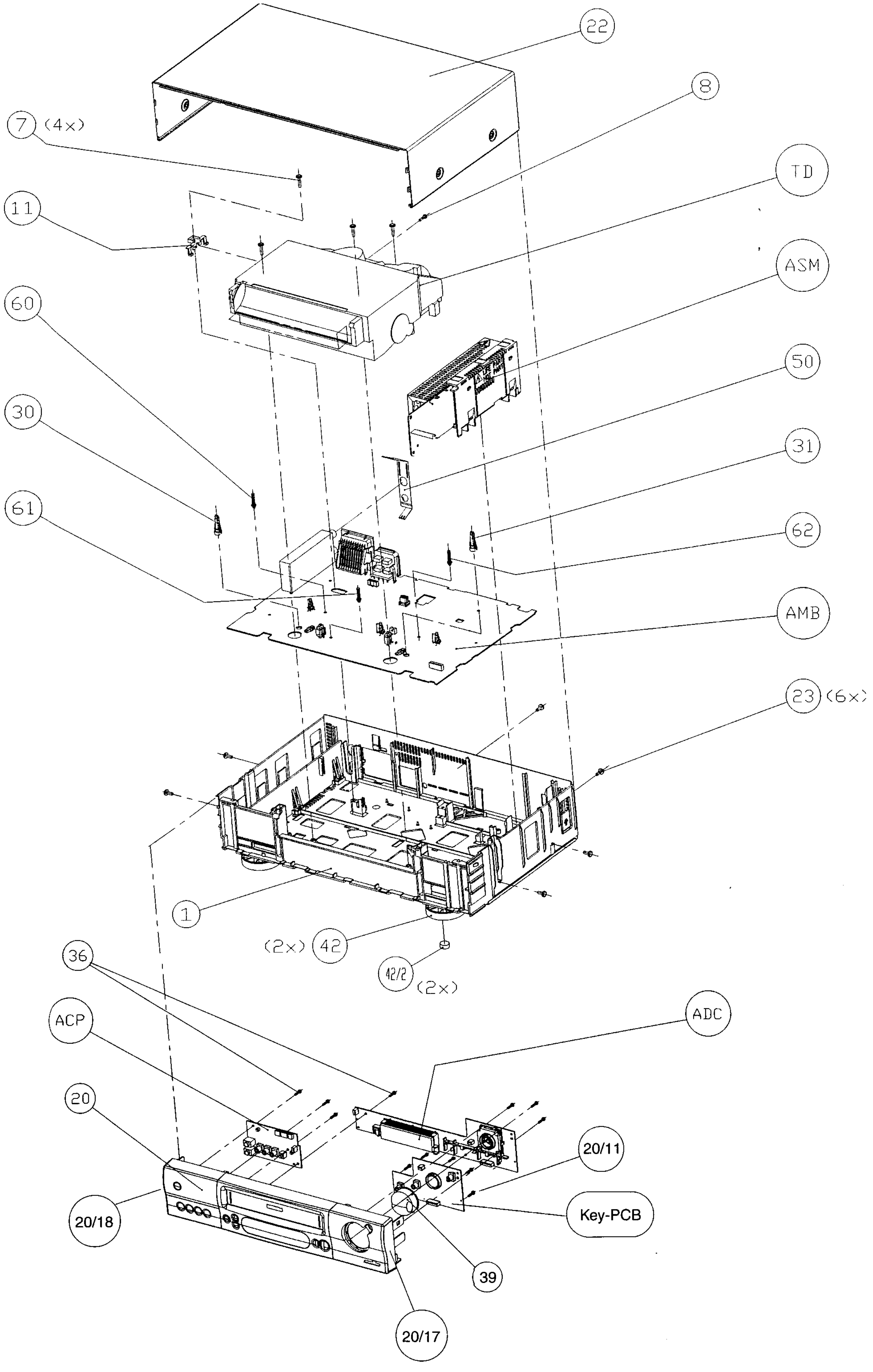
Para obtener un estandár de reparaciones elevado,es necesario cambiar todas las partes contenidas en el kit, la única exceptión es para el kit T.

A fin d'obtenir un standard de réparations élevé, toutes les pièces de rechange incluses dans un kit sont à remplacer, exception faite du kit T.

Om een hoge reparatiekwaliteit te waarbogen moeten, met uitzondering van kit T, altijd alle zich in een kit bevindende onderdelen worden vervangen.

Engineer's remarks

Exploded View of the Set & Mechanical Parts


22
8
7 (4×)
TD
11
ASM
60
50
30
31
61
62
AMB
23 (6×)
1
(2×) 42
42/2 (2×)
36
ADC
ACP
20
20/11
Key-PCB
20/18
39
20/17

Set Parts List

Position	Code Number	Description
1	3103 138 90890	FRAME ASSY
7	3103 100 42400	SCREW P3,5X16
8	4822 502 14431	SCREENING SCREW
11	4822 256 10504	TD-HOLDER
20	3103 138 89930	CONTROL PANEL ASSY VR710/02/16/58
20	3103 138 90750	CONTROL PANEL ASSY VR710/07
20	3103 138 90770	CONTROL PANEL ASSY VR710/39
20	3103 138 91070	CONTROL PANEL ASSY VR765/02/16/58
20	3103 138 91080	CONTROL PANEL ASSY VR765/07
20	3103 138 91100	CONTROL PANEL ASSY VR765/39
20	3103 138 89940	CONTROL PANEL ASSY VR810/02/16
20	3103 138 90780	CONTROL PANEL ASSY VR810/07
20	3103 138 90800	CONTROL PANEL ASSY VR810/39
20	3103 138 90810	CONTROL PANEL ASSY VR910/02/16/58
20	3103 138 90820	CONTROL PANEL ASSY VR910/07
20	3103 138 90840	CONTROL PANEL ASSY VR910/39
20/6	3103 178 29410	LIFT FLAP ASSY VR710-VR810
20/6	3103 178 29770	LIFT FLAP ASSY VR765-VR910
20/7	4822 492 70896	LEG SPRING LIFT FLAP
20/11	2511 076 50010	SCREW 3X8
20/12	3103 138 90140	KEY-PCB VR710/02/07/16/58
20/12	3103 138 91200	KEY-PCB VR710/39
20/12	3103 138 90150	KEY-PCB VR810/02/07/16/39
20/12	3103 138 91180	KEY-PCB VR765/02/07/16/58
20/12	3103 138 91380	KEY-PCB VR765/39
20/12	3103 138 91190	KEY-PCB VR910/02/07/16/39/58
20/17	3103 104 25620	SIDE CAP RIGHT VR710-VR810
20/17	3103 178 31360	SIDE CAP RIGHT VR765-VR910
20/18	3103 104 25610	SIDE CAP LEFT VR710-VR810
20/18	3103 178 31370	SIDE CAP LEFT VR765-VR910
22	3103 141 23350	COVER LAQUERED VR710-VR810
22	3103 141 23410	COVER LAQUERED VR765-VR910
23	4822 502 14109	PLASTITE SCREW 3,5X10
30, 31	4822 256 10198	DISTANCE HOLDER DECK
36	2511 076 50013	SCREW BK3X10
39	3103 104 25670	JOG KNOB VR810
39	3103 178 29840	JOG KNOB VR910
40	3103 104 25680	SHUTTLE RING VR810
40	3103 178 29830	SHUTTLE RING VR910
41	3103 178 29130	AV-COVER VR710-VR810/02/07/16/58
41	3103 178 29590	AV-COVER VR710-VR810/39
41	3103 178 29730	AV-COVER VR765-VR910/02/07/16/58
41	3103 178 30220	AV-COVER VR765-VR910/39
42	3103 178 29460	FOOT ASSY
42/2	4822 462 41806	FOOT RUBBER INLAY
43	2511 076 50013	SCREW BK3X10
50	4822 492 11687	SPRING
60, 61, 62	4822 256 10359	DISTANCE HOLDER MOBO

Power Supply ASM

MISCELLANEOUS

1115		242202514547	CONNECTOR 17P F 1.25 FFC 0.3
1150	▲	311225024750	MAINS BUSH
1151	▲	310313886490	FUSE T1.25A
1152	▲	242254943073	SURGE PROTECT
1153	▲	242208610514	FUSE T100mA

CAPACITORS

2150	▲	222233629146	220 nF 275V
2151		202030890136	100 nF 400V
2152		222215190014	47 µF 400V
2153	▲	202055490127	2.2 nF 250V
2154		202002191332	47 µF 50V
2155		222236545473	47 nF 250V
2156		202055890442	47 pF 2kV
2157		202055890442	47 pF 2kV
2158		202055295376	4.7 nF 50V
2159		202055291156	1 nF 50V
2160		202030890117	100 nF 50V
2161		202232600028	689 pF 100V
2162		202030890117	100 nF 50V
2163		319802534790	47 µF 25V
2164		319802531010	100 µF 25V
2165		202002191408	470 µF25V
2166		202002191408	470 µF25V
2167		202002191408	470 µF25V
2168		222237065682	6.8 nF 400V
2170		202002191332	47 µF 50V
2172		202055295376	4.7 nF 50V
2173		202002191386	2200 µF 16V
2174		202002490502	1000 µF 6.3V
2175		202030890117	100 nF 50V

RESISTORS

3150		212255000124	VDR DC 1MA/470V MAX 775V
3151	▲	232224213335	3.3 M
3152		212010390018	220 R
3153	▲	232224213335	3.3 M
3154	▲	232224213335	3.3 M
3155	▲	232220533109	10 R
3156		232219463123	12 k
3157	▲	232220733102	1 k FUSE NFR25H
3158	▲	232220533479	47 R NFR25
3159		319801106890	68 R
3160		319801104710	470 R 0.17W
3161		319801101820	1.8 k 0.17W
3162		319801108230	82 k
3163		319801108220	8.2 k 0.17W
3164		319801102220	2.2 k 0.17W
3165		319801104720	4.7 k 0.17W
3166		319801102230	22 k 0.17W
3167		232215623902	3.9 k 1%
3168		319801101530	15 k 0.17W
3169		232215621003	10 k 1%
3170		319801104710	470 R 0.17W
3171		232215621008	1.0 R 1%
3172		319801101090	10 R 0.17W
3175		319801102210	220 R 0.17W
3176		319801101020	1 k 0.17W
3177		319801101030	10 k 0.17W
3178		232215625602	5.6 k 1%
3179		212036890118	470 R TRIMMER
3180		232215624702	4.7 k 1%
3181		319801101090	10 R 0.17W
3182		319801101090	10 R 0.17W
3183		319801101510	150 R 0.17W
3184		319801101030	10 k 0.17W
3185		319801106810	680 R 0.17W
3186		319801101020	1 k 0.17W
3187		319801104710	470 R 0.17W
3188		319801102240	220 k 0.17W
3189		319801104730	47 k 0.17W
3190		319801101020	1 k 0.17W
3191	▲	230620403479	47 R FUSE NFR25
3192		319801103920	3.9 k 0.17W
3193		319801106830	68 k
3194		319801104720	4.7 k 0.17W
3195	▲	232220533478	4.7 R FUSE NFR25
3196		319801106810	680 R 0.17W
3197		319801101050	1 M 0.17W
3198		319801102240	220 k 0.17W
3199		232215623309	33 R 1%

COILS

5150	▲	311243820170	LINE FILTER CHOKE (TDK)
5151	▲	310312830460	TRANSF TDK SRW32ES
5153		242254943921	BEAD 150MHZ 1K B
5154		319801821090	10 µH
5155		242253596691	COIL 0MUH33 PM20
5156		242253594642	22 µH

DIODES

6151		933838660673	1N4006GP
6152		933838660673	1N4006GP
6153		933838660673	1N4006GP
6154		933838660673	1N4006GP
6155		933548710673	1N4003GP A (GI) A
6156		933548710673	1N4003GP A (GI) A
6157		933723420133	BYD33J
6158		933548710673	1N4003GP A (GI) A
6159		933548710673	1N4003GP A (GI) A
6160		933838660673	1N4006GP
6161		933624760133	BAT85
6162		932203213673	MTZJ5.6B A (RHM0)
6163		932203213673	MTZJ5.6B A (RHM0)
6164		932208187683	BYW98-200 RL
6165		932208187683	BYW98-200 RL
6166		932212672673	BYV27-200 A(TEGO)
6167		933723400133	BYD33D
6168		319801033390	BZX79-F33
6169		933723400133	BYD33D
6170		932212818682	SB340L-7010-PKG1
6172		319801010010	1N4148
6173		319801010010	1N4148
6174		319801010010	1N4148

TRANSISTORS & IC's

7150		932207704687	FET POW STP3NA60 FI
7151		932205310682	MC44603P
7152	▲	932208848682	OPTO COUPL K1150PG (TEG)
7153		932208367676	TL431CZ-AP
7154		319802043430	BC327-25
7155		319802043430	BC327-25
7156		319802040030	BC547B
7157		319802040030	BC547B
7158		932210646687	FET POW STD17N06-1(ST00)L
7159		319802040030	BC547B
7160		933535470126	MPSA43
7161		319802043430	BC327-25

REPAIR KITS

4822 310 11237	POWER SUPPLY REPAIR KIT

▲... Safety component, use only this type

Motherboard

MISCELLANEOUS

0007	310310761690	TACHO HOLDER
0008	310310761840	TACHO HOLDER
0020	310310761680	MOBO SENSORHOLDER DECK
0021	310310761680	MOBO SENSORHOLDER DECK
0022	310310761680	MOBO SENSORHOLDER DECK
1001	242254301125	CRYSTAL 4.43MHz
1322	▲ 242208610776	FUSE 0.5A
1323	▲ 242208610779	FUSE 1.0A
1324	▲ 242208610776	FUSE 0.5A
1325	▲ 242208610779	FUSE 1.0A
1451	242254300922	RESXTL 20MHZ 20P AT-49 A
1460	310310790110	SWITCH ASSY
1461	310310790110	SWITCH ASSY
1701	242254290063	TUMOD V+U PLL IEC BGIDK B
1703	242254944341	OFWK9656M
1704	242254942068	OFWG3956M
1704	932204272682	OFWK3953M
1705	242254941595	FILTER BS 5.5MHz
1705	242254940808	CER.FILTER TPS6,0MB-TF21F
1708	311229712190	TP926L MK2 (BOOSTER)

when changing TUMOD order also spring 4822 492 11687

1760	242254301119	CRYSTAL 4MHz
1761	242254300781	CRYSTAL 18.432MHz
1871	242254300779	QUARTZ 13MHZ875 20P HC49U
1911	310310720440	CONNECTOR 9P
1942	242202514527	CON BM V17P F1.25 FFC 0.3
1944	242202514524	CON V 14P F1.25 FFC 0.3
1946	310310720720	CAPSTAN-MOBO-SOCKET JST
1947	242202514512	CONNECTOR 3 PIN
1948	242202514515	CONNECTOR 6 PIN
1951	310310024010	SCART SOCKET 7133
1952	310310024210	SCART SOCKET 7135
1954	310310023300	CINCH 4FOLD
1956	242202514516	CONNECTOR 7 PIN
1957	242203411514	CONNECTOR 1 PIN
1960	242202514516	CONNECTOR 7 PIN
1964	242202509405	CONNECTOR 2 PIN
1991	242202514512	CONNECTOR 3 PIN

CAPACITORS

2000	319802321040	100	nF	25V
2001	319801701030	10	nF	50V
2002	319801701030	10	nF	50V
2003	319801701030	10	nF	50V
2004	319801721050	1	µF	16V
2005	319801721050	1	µF	16V
2006	319801701030	10	nF	50V
2007	319801701030	10	nF	50V
2008	319802321040	100	nF	25V
2009	319801701030	10	nF	50V
2011	319802322240	220	nF	25V
2012	319802304730	47	nF	25V
2013	319801702230	22	nF	50V
2014	319802321040	100	nF	25V
2015	319802951080	1	µF	50V
2016	319801701040	100	nF	16V
2017	319801721050	1	µF	16V
2018	319802931090	10	µF	25V
2019	319802931090	10	µF	25V
2020	319801701030	10	nF	50V
2021	319802931090	10	µF	25V
2022	319802321040	100	nF	25V
2023	319802321040	100	nF	25V
2024	319802922290	22	µF	16V
2025	319801701030	10	nF	50V
2026	319801701030	10	nF	50V
2027	319802954780	4.7	µF	50V
2028	319801701030	10	nF	50V
2029	319801721050	1	µF	16V
2030	319802951080	1	µF	50V
2032	319801701030	10	nF	50V
2033	319801701030	10	nF	50V
2034	319802321040	100	nF	25V
2035	319802922290	22	µF	16V
2036	202255205335	220	pF	50V
2037	319801602290	22	pF	50V
2038	202255205337	390	pF	50V
2039	319802902210	220	µF	6.3V
2040	319801608290	82	pF	50V
2041	319802321040	100	nF	25V
2042	319801602290	22	pF	50V
2043	319801603990	39	pF	50V
2044	319802321040	100	nF	25V
2045	319801701030	10	nF	50V
2046	319801604790	47	pF	50V
2047	319802921010	100	µF	16V
2049	319801602790	27	pF	50V
2050	319801701030	10	nF	50V
2052	319801602210	220	pF	50V
2053	319802924790	47	µF	16V
2054	319802954780	4.7	µF	50V
2055	319802924790	47	µF	16V
2056	319802954780	4.7	µF	50V
2057	319801724730	47	nF	50V
2060	319802321040	100	nF	25V
2071	319801701030	10	nF	50V
2072	319801601510	150	pF	50V
2073	319802921010	100	µF	16V
2074	202255205335	220	pF	50V
2075	319801701030	10	nF	50V
2076	319802321040	100	nF	25V
2077	319801701040	100	nF	16V
2078	319801701030	10	nF	50V
2079	319801608290	82	pF	50V
2080	319801601010	100	pF	50V
2082	319801701030	10	nF	50V
2083	319801701030	10	nF	50V
2084	319802931090	10	µF	25V
2085	202055295343	470	nF	16V
2086	319801701030	10	nF	50V
2087	319801606810	680	pF	50V
2088	319801721050	1	µF	16V
2089	319801702230	22	nF	50V
2090	319801602210	220	pF	50V
2091	319801701030	10	nF	50V
2092	319801601010	100	pF	50V
2093	319801604790	47	pF	50V
2094	319802321040	100	nF	25V
2095	319801721050	1	µF	16V
2096	319801701040	100	nF	16V
2097	319801601090	10	pF	50V
2098	319801701030	10	nF	50V
2099	202055295338	100	nF	
2101	319801601010	100	pF	50V
2104	319801602290	22	pF	50V
2105	202055295677	220	nF	
2106	319802924790	47	µF	16V
2107	319801701030	10	nF	50V
2108	319801702230	22	nF	50V
2110	319801701030	10	nF	50V
2111	319801701030	10	nF	50V
2112	319801701030	10	nF	50V
2113	319801701030	10	nF	50V
2114	319801701030	10	nF	50V
2115	319801701030	10	nF	50V
2116	319801701030	10	nF	50V
2117	319801701030	10	nF	50V
2118	319801701030	10	nF	50V
2122	202055295677	220	nF	
2123	319801701030	10	nF	50V
2124	319801701030	10	nF	50V
2125	319802924790	47	µF	16V
2126	319801602290	22	pF	50V
2321	319802321040	100	nF	25V
2322	319802321040	100	nF	25V
2323	319802532210	220	µF	25V
2324	319802532210	220	µF	25V
2325	319801403340	330	nF	50V
2326	319802532210	220	µF	25V
2328	319802921010	100	µF	16V
2400	319802921010	100	µF	16V
2401	319802321040	100	nF	25V
2402	319801601010	100	pF	50V
2403	319801601010	100	pF	50V
2404	319801702220	2.2	nF	50V
2405	319801602210	220	pF	50V

Motherboard

2406	319802921010	100 µF	16V
2408	319801721050	1 µF	16V
2411	319801702220	2.2 nF	50V
2412	319801701030	10 nF	50V
2451	319802321040	100 nF	25V
2452	319802922290	22 µF	16V
2453	319801721050	1 µF	16V
2454	319802321040	100 nF	25V
2455	319802321040	100 nF	25V
2456	319801602790	27 pF	50V
2457	319801603390	33 pF	50V
2458	319801701030	10 nF	50V
2459	319801602790	27 pF	50V
2461	319801704720	4.7 nF	50V
2462	319802531010	100 µF	25V
2463	319801701030	10 nF	50V
2471	319802924790	47 µF	16V
2472	319802921010	100 µF	16V
2473	319801704720	4.7 nF	50V
2474	319801702220	2.2 nF	50V
2475	319802924790	47 µF	16V
2476	319801703330	33 nF	50V
2477	319802321040	100 nF	25V
2478	319801701030	10 nF	50V
2479	319801701030	10 nF	50V
2480	319802921010	100 µF	16V
2482	319802321040	100 nF	25V
2483	319801702230	22 nF	50V
2484	202001292784	1 µF	50V
2485	202001292784	1 µF	50V
2486	202001292784	1 µF	50V
2487	319802321040	100 nF	25V
2489	319802532210	220 µF	25V
2490	319802321040	100 nF	25V
2491	319801601010	100 pF	50V
2492	319801702230	22 nF	50V
2493	319801701030	10 nF	50V
2494	319802321040	100 nF	25V
2495	319801724730	47 nF	50V
2496	319801702230	22 nF	50V
2497	319801701030	10 nF	50V
2501	212255100008	VDR	MAX 21V
2502	212255100008	VDR	MAX 21V
2503	212255100008	VDR	MAX 21V
2504	212255100008	VDR	MAX 21V
2505	212255100008	VDR	MAX 21V
2506	212255100008	VDR	MAX 21V
2507	212255100008	VDR	MAX 21V
2508	212255100008	VDR	MAX 21V
2509	212255100008	VDR	MAX 21V
2510	212255100008	VDR	MAX 21V
2511	212255100008	VDR	MAX 21V
2512	212255100008	VDR	MAX 21V
2513	319802921010	100 µF	16V
2514	319802924790	47 µF	16V
2515	319802321040	100 nF	25V
2516	319802321040	100 nF	25V
2517	319802321040	100 nF	25V
2518	319802321040	100 nF	25V
2519	319802321040	100 nF	25V
2520	319802321040	100 nF	25V
2521	319802321040	100 nF	25V
2522	319802321040	100 nF	25V
2523	319802924790	47 µF	16V
2526	319801721050	1 µF	16V
2527	319802924790	47 µF	16V
2528	319801721050	1 µF	16V
2529	319802924790	47 µF	16V
2530	319801721050	1 µF	16V
2532	319801601090	10 pF	50V
2533	319801721050	1 µF	16V
2534	319801601090	10 pF	50V
2535	319802931090	10 µF	25V
2536	319802931090	10 µF	25V
2537	319801604710	470 pF	50V
2538	319801604710	470 pF	50V
2539	319801701030	10 nF	50V
2540	319801701030	10 nF	50V
2541	319801601010	100 pF	50V
2542	319801606890	68 pF	50V
2543	319801701020	1 nF	50V
2544	319801701020	1 nF	50V
2545	319801701040	100 nF	16V
2546	319801601010	100 pF	50V
2547	319801601010	100 pF	50V
2601	319802321040	100 nF	25V
2602	319802922290	22 µF	16V
2603	319802924790	47 µF	16V
2604	319801721050	1 µF	16V
2605	319801701030	10 nF	50V
2606	319802321040	100 nF	25V
2607	319802924790	47 µF	16V
2608	319802321040	100 nF	25V
2609	319802924790	47 µF	16V
2610	319801701530	15 nF	50V
2611	202255205244	39 nF	50V
2612	319801702220	2.2 nF	50V
2613	319802931090	10 µF	25V
2614	319802321040	100 nF	25V
2615	319802924790	47 µF	16V
2616	319802952280	2.2 µF	50V
2617	319801721050	1 µF	16V
2618	319801701030	10 nF	50V
2619	319801701020	1 nF	50V
2620	319801603310	330 pF	50V
2621	319801701020	1 nF	50V
2622	202255205341	820 pF	50V
2623	319802931090	10 µF	25V
2624	319802304730	47 nF	25V
2625	202030090606	12 nF	50V
2626	319802922290	22 µF	16V
2641	319802924790	47 µF	16V
2642	319801701020	1 nF	50V
2643	319802924790	47 µF	16V
2644	202030090611	27 nF	50V
2645	319801703330	33 nF	50V
2646	202030090573	10 nF	50V
2651	319802921010	100 µF	16V
2652	319801701030	10 nF	50V
2653	319801701040	100 nF	16V
2654	319801702230	22 nF	50V
2655	319802952280	2.2 µF	50V
2656	319801601010	100 pF	50V
2657	223891015649	100 nF	25V
2658	319801703320	3.3 nF	50V
2659	319802924790	47 µF	16V
2660	319802931090	10 µF	25V
2661	223891015649	100 nF	25V
2662	319801701030	10 nF	50V
2663	319801703320	3.3 nF	50V
2664	319802924790	47 µF	16V
2665	319802931090	10 µF	25V
2666	319801701020	1 nF	50V
2668	202055295677	220 nF	
2669	202055295677	220 nF	
2671	319802951080	1 µF	50V
2672	319802951080	1 µF	50V
2674	202055295677	220 nF	
2675	202055295677	220 nF	
2677	202055295677	220 nF	
2678	202055295677	220 nF	
2679	319802951080	1 µF	50V
2680	319802931090	10 µF	25V
2681	319802951080	1 µF	50V
2683	319802931090	10 µF	25V
2684	319801721050	1 µF	16V
2685	319802931090	10 µF	25V
2686	202055295677	220 nF	
2687	319802321040	100 nF	25V
2701	202002191355	2.2 µF	50V
2702	319802321040	100 nF	25V
2703	319802552290	22 µF	50V
2704	319801604710	470 pF	50V
2705	319801701030	10 nF	50V
2706	319802931090	10 µF	25V
2707	319802321040	100 nF	25V
2708	319802322240	220 nF	25V
2709	202055294914	8.2 pF	50V
2710	319802321040	100 nF	25V
2712	319801701020	1 nF	50V
2713	319801601210	120 pF	50V
2714	319801602210	220 pF	50V

▲... Safety component, use only this type

Motherboard

2715	319802952280	2.2 μF	50V
2720	319802921010	100 μF	16V
2721	319802321040	100 nF	25V
2722	319801604710	470 pF	50V
2723	319802321040	100 nF	25V
2724	319801701030	10 nF	50V
2725	202055295499	100 nF	50V
2726	319802952280	2.2 μF	50V
2727	319801701040	100 nF	16V
2728	319801601010	100 pF	50V
2729	319801605690	56 pF	50V
2730	319801605690	56 pF	50V
2758	319801704720	4.7 nF	50V
2759	319801704720	4.7 nF	50V
2760	319801703320	3.3 nF	50V
2761	319801701040	100 nF	16V
2762	319802571090	10 μF	100V
2763	319801606810	680 pF	50V
2764	319801701030	10 nF	50V
2765	319801701040	100 nF	16V
2766	319802931090	10 μF	25V
2767	319801701030	10 nF	50V
2768	319802571090	10 μF	100V
2769	319802571090	10 μF	100V
2770	319801724740	470 nF	16V
2771	319801604790	47 pF	50V
2772	319801606810	680 pF	50V
2773	319801703320	3.3 nF	50V
2775	319801701030	10 nF	50V
2776	319802954780	4.7 μF	50V
2778	319801724740	470 nF	16V
2779	319801724740	470 nF	16V
2780	319801704720	4.7 nF	50V
2781	319801724740	470 nF	16V
2782	319802924790	47 μF	16V
2783	319801701040	100 nF	16V
2784	319801604790	47 pF	50V
2785	319801724740	470 nF	16V
2786	319801724740	470 nF	16V
2787	319801603380	3.3 pF	50V
2788	319801603380	3.3 pF	50V
2789	319801701030	10 nF	50V
2790	319802571090	10 μF	100V
2791	319801701030	10 nF	50V
2792	319801604790	47 pF	50V
2793	319801721050	1 μF	16V
2794	319801721050	1 μF	16V
2795	319801601020	1 nF	50V
2796	319801601020	1 nF	50V
2797	319801601020	1 nF	50V
2798	319801601020	1 nF	50V
2799	319802924790	47 μF	16V
2800	319801602290	22 pF	50V
2801	319801601090	10 pF	50V
2802	319802321040	100 nF	25V
2803	319802321040	100 nF	25V
2804	319802924790	47 μF	16V
2805	319801721050	1 μF	16V
2806	319801601090	10 pF	50V
2807	319801606810	680 pF	50V
2808	319801721050	1 μF	16V
2809	319801721050	1 μF	16V
2810	319801721050	1 μF	16V
2811	319801701030	10 nF	50V
2812	319802924790	47 μF	16V
2813	319802321040	100 nF	25V
2814	319801701030	10 nF	50V
2815	319801701030	10 nF	50V
2816	319801701030	10 nF	50V
2817	319802321040	100 nF	25V
2818	319801701030	10 nF	50V
2819	319801701030	10 nF	50V
2820	319801704720	4.7 nF	50V
2821	319801701030	10 nF	50V
2822	319802954780	4.7 μF	50V
2823	319802924790	47 μF	16V
2824	319801721050	1 μF	16V
2825	319801701030	10 nF	50V
2826	319801701030	10 nF	50V
2827	319802931090	10 μF	25V
2828	319801601020	1 nF	50V
2829	319801601020	1 nF	50V
2830	319802321040	100 nF	25V
2831	319802931090	10 μF	25V
2832	319801702220	2.2 nF	50V
2833	319801702220	2.2 nF	50V
2834	319801601810	180 pF	50V
2835	319801601810	180 pF	50V
2836	319801721050	1 μF	16V
2837	319801721050	1 μF	16V
2839	319802902210	220 μF	6.3V
2840	319801724740	470 nF	16V
2850	202030890117	100 nF	50V
2851	319802904790	47 μF	6.3V
2852	319802321040	100 nF	25V
2853	319802321040	100 nF	25V
2855	319801701040	100 nF	16V
2856	319802304730	47 nF	25V
2857	319801601210	120 pF	50V
2860	319801701020	1 nF	50V
2863	202055295677	220 nF	
2864	319801608280	8.2 pF	50V
2865	319801602290	22 pF	50V
2866	202055295338	100 nF	
2867	319801602290	22 pF	50V
2872	319802321040	100 nF	25V
2873	319802321040	100 nF	25V
2874	319802321040	100 nF	25V
2875	319801602290	22 pF	50V
2876	319801602290	22 pF	50V
2877	319802924790	47 μF	16V
2878	319802321040	100 nF	25V

RESISTORS

3001	319801102220	2.2 k	0.17W
3002	319802151820	1.8 k	0.1W
3003	319802151020	1 k	0.1W
3004	319802158220	8.2 k	0.1W
3005	319802151020	1 k	0.1W
3006	319801105620	5.6 k	0.17W
3009	319802151010	100 R	0.1W
3010	319801104730	47 k	0.17W
3011	319801101020	1 k	0.17W
3012	319801103930	39 k	0.17W
3013	319802151050	1 M	0.1W
3015	319802155610	560 R	0.1W
3016	319802151030	10 k	0.1W
3017	212010892619	2.2 k	1%
3019	212010892614	680 R	1%
3020	212010893465	1.3 k	1%
3021	319802152240	220 k	0.1W
3022	319802151540	150 k	0.1W
3023	319802152210	220 R	0.1W
3024	319802151030	10 k	0.1W
3025	319802152710	270 R	0.1W
3026	212010892624	4.7 k	1%
3027	319802154710	470 R	0.1W
3029	319802154710	470 R	0.1W
3030	319801106810	680 R	0.17W
3031	319802151020	1 k	0.1W
3032	319802152220	2.2 k	0.1W
3033	319802151510	150 R	0.1W
3034	319801102220	2.2 k	0.17W
3035	319801101010	100 R	0.17W
3036	319801103310	330 R	0.17W
3037	319802152220	2.2 k	0.1W
3041	319801106810	680 R	0.17W
3042	319801104710	470 R	0.17W
3046	319802152220	2.2 k	0.1W
3047	319801104730	47 k	0.17W
3048	319801101040	100 k	0.17W
3061	319802151230	12 k	0.1W
3062	319802151520	1.5 k	0.1W
3063	319802158220	8.2 k	0.1W
3065	319801103920	3.9 k	0.17W
3066	319802154720	4.7 k	0.1W
3067	319801101020	1 k	0.17W
3068	319802153330	33 k	0.1W
3069	319802152720	2.7 k	0.1W
3070	319802151020	1 k	0.1W

Motherboard

3072		319801101520	1.5	k	0.17W
3073		319802158220	8.2	k	0.1W
3074		212010892514	15	k	1%
3075		319802151040	100	k	0.1W
3076		319802151030	10	k	0.1W
3077		319802153920	3.9	k	0.1W
3078		319802151830	18	k	0.1W
3079		319802156810	680	R	0.1W
3081		319802152220	2.2	k	0.1W
3082		319801104720	4.7	k	0.17W
3083		319801101020	1	k	0.17W
3084		319802152230	22	k	0.1W
3085		319802152730	27	K	0.1W
3086		319802152720	2.7	k	0.1W
3087		319802151030	10	k	0.1W
3088		212036890124	22	k	POT
3089		212036890119	1	k	POT
3090		319801101030	10	k	0.17W
3091		319802154720	4.7	k	0.1W
3092		319802154720	4.7	k	0.1W
3093		319802151030	10	k	0.1W
3094		319802151030	10	k	0.1W
3095		319801101010	100	R	0.17W
3101		319802154720	4.7	k	0.1W
3102		319802155610	560	R	0.1W
3103		319802155610	560	R	0.1W
3104		319802151120	1.1	k	
3105		319802154720	4.7	k	0.1W
3106		319802151530	15	k	0.1W
3107		319802153310	330	R	0.1W
3108		319802154720	4.7	k	0.1W
3109		319802154710	470	R	0.1W
3110		319802153310	330	R	0.1W
3111		319802152240	220	k	0.1W
3112		319802151030	10	k	0.1W
3113		319802153310	330	R	0.1W
3114		212010892631	27	k	1%
3115		212010892672	5.6	R	
3116		319802151230	12	k	0.1W
3118		212036890123	10	k	POT
3119		319802152220	2.2	k	0.1W
3120		319802151020	1	k	0.1W
3321		319801102240	220	k	0.17W
3322		319801104790	47	R	0.17W
3323		319802151030	10	k	0.1W
3325		319802152240	220	k	0.1W
3327		319801102210	220	R	0.17W
3328		319801101020	1	k	0.17W
3330		319801104720	4.7	k	0.17W
3331		319801101040	100	k	0.17W
3332		319802151030	10	k	0.1W
3334		319802151030	10	k	0.1W
3335		319802154720	4.7	k	0.1W
3336		319801101030	10	k	0.17W
3337		319802151040	100	k	0.1W
3340		319801101020	1	k	0.17W
3341		319802151010	100	R	0.1W
3344		319801101010	100	R	0.17W
3352		319801101020	1	k	0.17W
3354		319802154730	47	k	0.1W
3357		319801104730	47	k	0.17W
3358		319801101020	1	k	0.17W
3363		319801103910	390	R	0.17W
3364		319801103330	33	k	0.17W
3365		319802151030	10	k	0.1W
3371	▲	232220533228	2.2	R	NFR25
3372		319802152230	22	k	0.1W
3373		319802154710	470	R	0.1W
3374		319802152210	220	R	0.1W
3375		319802151030	10	k	0.1W
3376		319802154720	4.7	k	0.1W
3377		319801101080	1	R	0.17W
3378		319802154730	47	k	0.1W
3379		319802153920	3.9	k	0.1W
3380		319801102710	270	R	0.17W
3381		319801105620	5.6	k	0.17W
3382		319802151030	10	k	0.1W
3383		319801101030	10	k	0.17W
3385		319802152230	22	k	0.1W
3386		319801103330	33	k	0.17W
3387		319802158230	82	k	0.1W
3388		319802154720	4.7	k	0.1W
3390		319802154710	470	R	0.1W
3391		319802152250	2.2	M	0.1W
3392		319802151040	100	k	0.1W
3393		319802151040	100	k	0.1W
3394		319802154730	47	k	0.1W
3397		319802151010	100	R	0.1W
3398		319802154720	4.7	k	0.1W
3403		319802151010	100	R	0.1W
3404		319802152730	27	K	0.1W
3405		319802156820	6.8	k	0.1W
3406		319802190020	CHIP JUMPER		
3407		319802151010	100	R	0.1W
3409		319802152220	2.2	k	0.1W
3410		319802152220	2.2	k	0.1W
3413		319801101010	100	R	0.17W
3415		319802152220	2.2	k	0.1W
3416		319802155630	56	k	0.1W
3417		319801102220	2.2	k	0.17W
3419		319802152220	2.2	k	0.1W
3422		319802154730	47	k	0.1W
3423		319802154720	4.7	k	0.1W
3425		319802153330	33	k	0.1W
3426	▲	232220533109	10	R	
3427		319802152210	220	R	0.1W
3428		319801101020	1	k	0.17W
3429		319802151030	10	k	0.1W
3430		319802151020	1	k	0.1W
3432		319801101030	10	k	0.17W
3433		319801104720	4.7	k	0.17W
3435		319802154720	4.7	k	0.1W
3436		319801101010	100	R	0.17W
3438		319802154730	47	k	0.1W
3440		319802151030	10	k	0.1W
3444		319801103310	330	R	0.17W
3446		319801101030	10	k	0.17W
3447		319801101010	100	R	0.17W
3449		319802151030	10	k	0.1W
3450		319802151030	10	k	0.1W
3451		319802151030	10	k	0.1W
3452		319802151020	1	k	0.1W
3454		319802158210	820	R	0.1W
3455		319802151030	10	k	0.1W
3457		319802154710	470	R	0.1W
3458		319802151020	1	k	0.1W
3459		319802154730	47	k	0.1W
3460		319802154720	4.7	k	0.1W
3461		319802158220	8.2	k	0.1W
3462		319802152230	22	k	0.1W
3463		319802152230	22	k	0.1W
3464		319802154730	47	k	0.1W
3465		319801101020	1	k	0.17W
3466		319801101040	100	k	0.17W
3467		319801102220	2.2	k	0.17W
3472		319802151230	12	k	0.1W
3473		319801101230	12	k	0.17W
3474		319802154720	4.7	k	0.1W
3475		319802154720	4.7	k	0.1W
3476		319802154730	47	k	0.1W
3477		319802154730	47	k	0.1W
3478		319802151030	10	k	0.1W
3479		319801102220	2.2	k	0.17W
3480		319801101020	1	k	0.17W
3483		319801101030	10	k	0.17W
3488		319802151020	1	k	0.1W
3490		319802152230	22	k	0.1W
3492		319801104730	47	k	0.17W
3493		319801104720	4.7	k	0.17W
3495		319801102220	2.2	k	0.17W
3496		319802152210	220	R	0.1W
3497		319802151030	10	k	0.1W
3498		319802151030	10	k	0.1W
3499		319802154720	4.7	k	0.1W
3503		319801102210	220	R	0.17W
3504		319802157590	75	R	0.1W
3505		319802157590	75	R	0.1W
3507		319802152210	220	R	0.1W
3509		319802152210	220	R	0.1W
3511		319802157590	75	R	0.1W
3513		319802152210	220	R	0.1W
3514		319802152210	220	R	0.1W

▲... Safety component, use only this type

Motherboard

3515	319802152210	220	R	0.1W
3516	319802152210	220	R	0.1W
3518	319802157590	75	R	0.1W
3519	319801104720	4.7	k	0.17W
3520	319802151030	10	k	0.1W
3521	319802156820	6.8	k	0.1W
3522	319802155630	56	k	0.1W
3523	319801103910	390	R	0.17W
3524	319801108210	820	R	0.17W
3525	319801103330	33	k	0.17W
3528	319801101230	12	k	0.17W
3529	319801101010	100	R	0.17W
3533	319802152240	220	k	0.1W
3535	319802152240	220	k	0.1W
3536	319801102240	220	k	0.17W
3538	319802152220	2.2	k	0.1W
3543	319802151830	18	k	0.1W
3544	319802154720	4.7	k	0.1W
3545	319802152240	220	k	0.1W
3546	319802151830	18	k	0.1W
3547	319802154720	4.7	k	0.1W
3548	319802152240	220	k	0.1W
3549	319802152230	22	k	0.1W
3550	319802151040	100	k	0.1W
3551	319802153940	390	k	0.1W
3552	319802151040	100	k	0.1W
3553	319802153940	390	k	0.1W
3554	319802151040	100	k	0.1W
3555	319802151040	100	k	0.1W
3556	319802151510	150	R	0.1W
3557	319802151510	150	R	0.1W
3558	319802151010	100	R	0.1W
3559	319802151010	100	R	0.1W
3560	319802151010	100	R	0.1W
3561	319802151010	100	R	0.1W
3562	319801101510	150	R	0.17W
3601	319801104730	47	k	0.17W
3602	319802152250	2.2	M	0.1W
3603	319802158220	8.2	k	0.1W
3604	319801101010	100	R	0.17W
3606	319802151030	10	k	0.1W
3607	319802151230	12	k	0.1W
3608	319802151830	18	k	0.1W
3609	319802152230	22	k	0.1W
3610	319802153320	3.3	k	0.1W
3611	319801103390	33	R	0.17W
3612	319802156820	6.8	k	0.1W
3613	319802151530	15	k	0.1W
3614	319801104720	4.7	k	0.17W
3615	319802153910	390	R	0.1W
3616	319802156810	680	R	0.1W
3617	319802151030	10	k	0.1W
3618	319802154750	4.7	M	0.1W
3619	319802152240	220	k	0.1W
3620	319801102220	2.2	k	0.17W
3621	319802158220	8.2	k	0.1W
3622	319801102230	22	k	0.17W
3623	319802151230	12	k	0.1W
3624	319802154730	47	k	0.1W
3625	319802152220	2.2	k	0.1W
3626	212036890126	100	k	POT
3627	212010891729	390	k	0.1W
3628	319802154730	47	k	0.1W
3629	319802152220	2.2	k	0.1W
3630	319802156810	680	R	0.1W
3631	319801104790	47	R	0.17W
3632	319802151090	10	R	0.1W
3633	212010892664	1.5	R	
3641	319802151830	18	k	0.1W
3642	319801103310	330	R	0.17W
3643	319802153920	3.9	k	0.1W
3644	319802152240	220	k	0.1W
3645	319802153330	33	k	0.1W
3646	319802156830	68	k	0.1W
3647	319802151090	10	R	0.1W
3648	212010892664	1.5	R	
3651	319801101030	10	k	0.17W
3652	212010892633	39	k	1%
3653	319802151010	100	R	0.1W
3654	319801101010	100	R	0.17W
3655	319802156830	68	k	0.1W

3656	319802155620	5.6	k	0.1W
3657	319802156830	68	k	0.1W
3658	319802155620	5.6	k	0.1W
3659	319802151040	100	k	0.1W
3660	319802151040	100	k	0.1W
3663	319802154750	4.7	M	0.1W
3664	319801101020	1	k	0.17W
3700	319802154710	470	R	0.1W
3701	319802153930	39	k	0.1W
3702	319801101040	100	k	0.17W
3703	319802151830	18	k	0.1W
3704	319802153330	33	k	0.1W
3705	319801106810	680	R	0.17W
3706	319802153310	330	R	0.1W
3707	212036890124	22	k	POT
3708	319802151830	18	k	0.1W
3709	319802151540	150	k	0.1W
3710	319802152210	220	R	0.1W
3711	319802153320	3.3	k	0.1W
3712	319802151020	1	k	0.1W
3714	319802151010	100	R	0.1W
3715	319802153310	330	R	0.1W
3715	319802152710	270	R	0.1W
3716	319802153320	3.3	k	0.1W
3718	319802152220	2.2	k	0.1W
3719	319802156820	6.8	k	0.1W
3721	319802154720	4.7	k	0.1W
3722	319802151010	100	R	0.1W
3723	319802151010	100	R	0.1W
3724	319802152230	22	k	0.1W
3726	319802151020	1	k	0.1W
3727	319802155620	5.6	k	0.1W
3728	319802155620	5.6	k	0.1W
3729	319802155620	5.6	k	0.1W
3730	212036890126	100	k	POT
3731	319801104710	470	R	0.17W
3732	319802151010	100	R	0.1W
3733	319802152720	2.7	k	0.1W
3734	319802153310	330	R	0.1W
3762	319802155620	5.6	k	0.1W
3763	319802190020	CHIP JUMPER		
3764	319801104720	4.7	k	0.17W
3765	319801101010	100	R	0.17W
3768	319802155620	5.6	k	0.1W
3770	319802151020	1	k	0.1W
3771	212010891686	7.5	k	
3772	319802151020	1	k	0.1W
3773	319802151020	1	k	0.1W
3774	319802151020	1	k	0.1W
3775	319802152720	2.7	k	0.1W
3776	319802151010	100	R	0.1W
3777	319802151010	100	R	0.1W
3778	319802154710	470	R	0.1W
3779	319802154710	470	R	0.1W
3801	319802152720	2.7	k	0.1W
3802	319802152720	2.7	k	0.1W
3803	319802151040	100	k	0.1W
3804	319801101030	10	k	0.17W
3805	319801101040	100	k	0.17W
3806	319801104790	47	R	0.17W
3807	319801101040	100	k	0.17W
3808	319801102720	2.7	k	0.17W
3809	319802151520	1.5	k	0.1W
3810	319802151820	1.8	k	0.1W
3811	319801101040	100	k	0.17W
3812	319801108220	8.2	k	0.17W
3813	319801102230	22	k	0.17W
3815	319802153310	330	R	0.1W
3817	212036890121	2.2	k	trim.
3818	319801108210	820	R	0.17W
3819	319802151830	18	k	0.1W
3820	319802151830	18	k	0.1W
3821	319801102230	22	k	0.17W
3822	319802152230	22	k	0.1W
3823	319802154740	470	k	0.1W
3830	319802154720	4.7	k	0.1W
3831	319802151040	100	k	0.1W
3832	319802152230	22	k	0.1W
3833	319802151530	15	k	0.1W
3834	319802154720	4.7	k	0.1W
3835	319802154720	4.7	k	0.1W

▲... Safety component, use only this type

3836	319802154720	4.7	k	0.1W
3837	319802152220	2.2	k	0.1W
3838	319802152220	2.2	k	0.1W
3839	319802151060	10	M	
3840	319802151060	10	M	
3841	319802153330	33	k	0.1W
3842	319802153330	33	k	0.1W
3843	319802153330	33	k	0.1W
3844	319802153330	33	k	0.1W
3845	319802153330	33	k	0.1W
3846	319802153330	33	k	0.1W
3851	319802156830	68	k	0.1W
3852	319802153320	3.3	k	0.1W
3853	319802153320	3.3	k	0.1W
3856	212010891725	270	k	0.1W
3857	319801101010	100	R	0.17W
3867	319802151010	100	R	0.1W
3868	319802152220	2.2	k	0.1W
3870	319802158210	820	R	0.1W
3871	319802154730	47	k	0.1W
3872	319802154730	47	k	0.1W
3873	319802154730	47	k	0.1W
3876	319802151030	10	k	0.1W
3880	319801101080	1	R	0.17W
3881	319802158210	820	R	0.1W
3882	319801108210	820	R	0.17W

RESISTORS

4100	319802190020	CHIP JUMPER
4101	319802190020	CHIP JUMPER
4102	319802190020	CHIP JUMPER
4103	319802190020	CHIP JUMPER
4104	319802190020	CHIP JUMPER
4105	319802190020	CHIP JUMPER
4106	319802190020	CHIP JUMPER
4107	319802190020	CHIP JUMPER
4108	319802190020	CHIP JUMPER
4110	319802190020	CHIP JUMPER
4111	319802190020	CHIP JUMPER
4452	319802190020	CHIP JUMPER
4456	319802190020	CHIP JUMPER
4481	319802190020	CHIP JUMPER
4482	319802190020	CHIP JUMPER
4485	319802190020	CHIP JUMPER
4486	319802190020	CHIP JUMPER
4487	319802190020	CHIP JUMPER
4488	319802190020	CHIP JUMPER
4489	319802190020	CHIP JUMPER
4490	319802190020	CHIP JUMPER
4491	319802190020	CHIP JUMPER
4492	319802190020	CHIP JUMPER
4493	319802190020	CHIP JUMPER
4494	319802190020	CHIP JUMPER
4496	319802190020	CHIP JUMPER
4498	319802190020	CHIP JUMPER
4499	319802190020	CHIP JUMPER
4502	319802190020	CHIP JUMPER
4503	319802190020	CHIP JUMPER
4651	319802190020	CHIP JUMPER
4652	319802190020	CHIP JUMPER
4701	319802190020	CHIP JUMPER
4704	319802190020	CHIP JUMPER
4705	319802190020	CHIP JUMPER
4706	319802190020	CHIP JUMPER
4711	319802190020	CHIP JUMPER
4712	319802190020	CHIP JUMPER
4713	319802190020	CHIP JUMPER
4722	319802190020	CHIP JUMPER
4724	319802190020	CHIP JUMPER
4759	319802190020	CHIP JUMPER
4761	319802190020	CHIP JUMPER
4762	319802190020	CHIP JUMPER
4763	319802190020	CHIP JUMPER
4764	319802190020	CHIP JUMPER
4765	319802190020	CHIP JUMPER
4852	319802190020	CHIP JUMPER
4911	319802190020	CHIP JUMPER
4912	319802190020	CHIP JUMPER
4914	319802190020	CHIP JUMPER
4916	319802190020	CHIP JUMPER

COILS

5001	319801821090	10 µH
5002	242253594339	150 µH
5004	242253594335	56 µH
5005	242253594334	47 µH
5006	242253594327	15 µH
5008	242253594325	10 µH
5009	242253594338	100 µH
5010	242253594323	6.8 µH 5%
5071	242253594692	6.8 µH 5%
5072	242253597877	10 µH
5073	242253594335	56 µH
5074	242253594329	22 µH
5075	242253594699	27 µH 5%
5076	319801890090	COIL
5100	242253594272	22 µH 5%
5101	242253597333	100 µH 10%
5322	242253597333	100 µH 10%
5323	242253597342	22 µH 10%
5453	242253594325	10 µH
5454	242253595097	BOB 2,4MU FBA04HA900BB TY
5455	242254941993	IND FXD100MHZ600R BLM21KB
5456	242254941993	IND FXD100MHZ600R BLM21KB
5457	242254941993	IND FXD100MHZ600R BLM21KB
5471	242253594118	INDFXD SPT0203A0U33 PM10A
5501	242253594323	6.8 µH 5%
5601	242253596863	10 µH 5%
5602	310313824910	COIL ASSY
5603	242254941993	IND FXD100MHZ600R BLM21KB
5641	310313824910	COIL ASSY
5701	242253594327	15 µH
5702	242254941645	IND VAR 0,256UH +6-10%
5703	242254941993	IND FXD100MHZ600R BLM21KB
5704	242254941645	IND VAR 0,256UH +6-10%
5706	242253594323	6.8 µH 5%
5708	242253594325	10 µH
5760	319801821090	10 µH
5761	319801821010	COIL
5762	319801821090	10 µH
5803	242254941993	IND FXD100MHZ600R BLM21KB
5804	242254941993	IND FXD100MHZ600R BLM21KB
5805	242254941993	IND FXD100MHZ600R BLM21KB
5806	242254941993	IND FXD100MHZ600R BLM21KB
5807	242254941993	IND FXD100MHZ600R BLM21KB
5853	242253594325	10 µH
5854	242253594327	15 µH
5856	242253594323	6.8 µH 5%
5871	242253594325	10 µH
5872	242254941993	IND FXD100MHZ600R BLM21KB

DIODES

6401	933624760133	BAT85
6460	310313887290	OPTO ASSY TCZT8299-PAER
6503	932203796673	MTZJ6.8C
6507	932203216673	MTZJ12C
6601	933712670673	BZX55-B7V5 A
6702	934025520115	BA792
6761	319801010010	1N4148

TRANSISTORS & IC's

7001	319801042030	BC847B
7002	319801042030	BC847B
7003	932210079685	LC89980M
7004	319801042150	BC857B
7005	932211964671	LA71527M (TSAJ) Y
7006	319801042030	BC847B
7007	319801044020	PDTA124ET
7008	319801042030	BC847B
7009	319801042030	BC847B
7010	933092111215	BFS20
7011	933092111215	BFS20
7014	319801042030	BC847B
7015	319801042150	BC857B
7016	319801042030	BC847B
7071	319801042150	BC857B

Motherboard

7072	932214759682	LA7339A
7073	319801042030	BC847B
7074	319801042030	BC847B
7075	319801042030	BC847B
7091	933406660653	HEF4094BT
7092	319801044120	PDTC124ET
7101	319801042030	BC847B
7102	319801042030	BC847B
7103	932211188668	STV5744ADT
7104	932203746668	STV5712TR
7105	319801044020	PDTA124ET
7106	319801044020	PDTA124ET
7107	319801044120	PDTC124ET
7321	932214226687	FET POW STD16NE06-1 L
7322	933946350215	FET SIG BSS138
7323	932214226687	FET POW STD16NE06-1 L
7324	319801042030	BC847B
7325	319802043530	BC337-25
7326	319802043430	BC327-25
7327	319801042150	BC857B
7328	319801042030	BC847B
7329	319801042030	BC847B
7401	932211746668	M24128-MN6 (ST00) R
7404	319801042030	BC847B
7406	310316530010	TMP93C071F 120PIN
7407	319802043530	BC337-25
7408	319801042150	BC857B
7412	319801044020	PDTA124ET
7413	319801042030	BC847B
7414	319801042030	BC847B
7415	319801042030	BC847B
7440	933979290682	L2722
7441	319801044020	PDTA124ET
7442	319801042030	BC847B
7443	935034880112	SAA1310/N2
7446	935211440112	TDA5241
7451	310317855360	EPROM ASSY ACOP8-Ux
7452	932212786682	CY62256LL-70PC(CYPR) L
7461	310313887290	OPTO ASSY TCZT8299-PAER
7462	310313887290	OPTO ASSY TCZT8299-PAER
7464	932209789682	OPT CP TCRT5000L
7465	932209789682	OPT CP TCRT5000L
7466	932209791682	OPT CP TCST1030L
7502	933628640215	CHIP BC817/40
7504	319801042030	BC847B
7505	319801044120	PDTC124ET
7506	932212428682	STV6401
7508	319801044120	PDTC124ET
7510	319801044120	PDTC124ET
7511	933372950653	HEF4052BT
7512	932209259668	TL072 (ST00) R
7603	933589730215	BC856B
7604	319802043430	BC327-25
7605	933589560215	BC846B
7606	933589560215	BC846B
7607	319801042030	BC847B
7608	933628640215	CHIP BC817/40
7641	319801042150	BC857B
7642	319801042030	BC847B
7643	933628640215	CHIP BC817/40
7651	935262251557	TDA9616H/N2 Y
7701	933372960653	HEF4053BT
7702	319801044120	PDTC124ET
7703	319801042030	BC847B
7704	319801042150	BC857B
7705	935260611118	TDA9818T/V1 R
7705	935262113118	TDA9817T/V1 R
7706	319801042030	BC847B
7707	319801042030	BC847B
7760	935264081557	TDA9873HZ for German Stereo
7761	932214797668	MSP3415D-QG-B3
7761	932215069671	MSP3451G-QG-A1(MIAS) for Smart Sound only
7762	319801042030	BC847B
7801	933092111215	BFS20
7802	319801042150	BC857B
7803	932214339668	TS339CD (ST00)R
7804	933092111215	BFS20
7805	319801044020	PDTA124ET
7807	932211821682	TA1225N (TOSJ) L
7830	933984900682	LM339N ST
7831	319801042030	BC847B
7832	319801042030	BC847B
7851	932213621668	SDA5652-2X
7854	319801042150	BC857B
7855	319801042030	BC847B
7856	319801042150	BC857B
7871	932213702668	STV5348D SO28

RESISTORS

9051	319802190020	CHIP JUMPER
9512	319802190020	CHIP JUMPER
9525	319802190020	CHIP JUMPER
9701	319802190020	CHIP JUMPER

▲... Safety component, use only this type

Display Control ADCP18

MISCELLANEOUS

1234	242212915676	SWI JOG-SHUT EVQWM7-001
1261	242254098328	CER RES 8MHZ EFOEC8004T4A
1262	242254300056	CRYSTAL 32.768kHz
1281	242212802921	SWITACT 1P 50MA 12V EVQPV
1282	242212802921	SWITACT 1P 50MA 12V EVQPV
1295	242212802921	SWITACT 1P 50MA 12V EVQPV
1920	242202514524	CONNECTOR 14P F1.25 FFC 0.3
1922	242202514515	CONNECTOR 6 PIN
1923	242202514535	CONNECTOR 6P F 1.25 FFC 0.3

CAPACITORS

2200	202002590011	SUPCAP SD 5V5 220M P80M20
2201	202001293647	ELCAP MS7 6V3 S 220U PM20
2202	319802321040	100 nF 25V
2203	319801701030	10 nF 50V
2221	319801701020	1 nF 50V
2225	319802922290	22 µF 16V
2230	319801701030	10 nF 50V
2231	319801724730	47 nF 50V
2250	202055295499	100 nF 50V
2262	319801601590	15 pF 50V
2263	319801601590	15 pF 50V

RESISTORS

3210	319801101010	100 R 0.17W
3211	319801101010	100 R 0.17W
3212	319802154720	4.7 k 0.1W
3213	319802152730	27 K 0.1W
3214	319802152730	27 K 0.1W
3215	319802154710	470 R 0.1W
3216	319802152730	27 K 0.1W
3217	319802152730	27 K 0.1W
3218	319802152730	27 K 0.1W
3219	319802152730	27 K 0.1W
3220	319801102210	220 R 0.17W
3221	319801101030	10 k 0.17W
3222	319802151020	1 k 0.1W
3223	319802151530	15 k 0.1W
3224	319802152220	2.2 k 0.1W
3226	319802152210	220 R 0.1W
3227	319802151030	10 k 0.1W
3228	319802151030	10 k 0.1W
3230	319802152220	2.2 k 0.1W
3231	319802152210	220 R 0.1W
3232	319802152210	220 R 0.1W
3233	319802152210	220 R 0.1W
3234	319802152210	220 R 0.1W
3235	319802151030	10 k 0.1W
3236	319802152210	220 R 0.1W
3237	319802154720	4.7 k 0.1W
3238	319802152710	270 R 0.1W
3240	319802151030	10 k 0.1W
3241	319802151030	10 k 0.1W
3246	319802151040	100 k 0.1W
3247	319802151040	100 k 0.1W
3250	319802151830	18 k 0.1W
3251	319801101010	100 R 0.17W
3252	319801101010	100 R 0.17W
3257	319801104780	4.7 R 0.17W
3258	319801104780	4.7 R 0.17W
3259	319801104780	4.7 R 0.17W
3269	319802151030	10 k 0.1W
3279	319802151030	10 k 0.1W
3280	319802151030	10 k 0.1W
3281	319802151820	1.8 k 0.1W
3282	319802154720	4.7 k 0.1W
3289	319802151030	10 k 0.1W
3295	319802153930	39 k 0.1W
3299	319802151030	10 k 0.1W
3900	319802190020	CHIP JUMPER
3901	319802190020	CHIP JUMPER
3902	319802190020	CHIP JUMPER
3906	319802190020	CHIP JUMPER
3907	319802190020	CHIP JUMPER
3908	319802190020	CHIP JUMPER
3909	319802190020	CHIP JUMPER
3910	319802190020	CHIP JUMPER
3911	319802190020	CHIP JUMPER
3912	319802190020	CHIP JUMPER
3921	319802190020	CHIP JUMPER
3925	319802190020	CHIP JUMPER
3927	319802190020	CHIP JUMPER
3931	319802190020	CHIP JUMPER

COILS

5200	242253597333	100 µH 10%
5201	242253594323	6.8 µH 5%

DIODES

6200	933624760133	BAT85
6250	319801021090	BZX79-C10

TRANSISTORS & IC's

7200	310316513100	TMP87CH70F AD0P1-1U
7202	310316500250	VACUUM FLUORESC. DISPLAY
7220	932211213687	IR REC TSOP1736(TEGO) L
7231	319801044120	PDTC124ET
7232	319801044120	PDTC124ET
7234	319801042150	BC857B
7235	319801042150	BC857B
7236	319801044020	PDTA124ET
7240	319801042150	BC857B
7241	319801042150	BC857B

▲... Safety component, use only this type

Connector PCB ACP18, CABLES

MISCELLANEOUS

0010	310310416590	LED-SOCKET
1551	242212802921	SWITACT 1P 50MA 12V EVQPV
1929	242202514515	CONNECTOR 6 PIN
1980	242202514532	CONNECTOR 3 PIN
1981	310314027000	CABLTREE A 1POL BUPI-1957
1982	242202514536	CONNECTOR 7P F 1.25 FFC 0.3
1985	310310024260	CINCH SOCKET 3 FOLD
1989	242202604436	CON HSJ1452

CAPACITORS

2551	319801604710	470 pF 50V
2552	319801721050	1 µF 16V
2553	319801701040	100 nF 16V
2554	319801604710	470 pF 50V
2555	319801721050	1 µF 16V
2556	319801701040	100 nF 16V

RESISTORS

3551	212255100008	VDR MAX 21V
3552	319802151050	1 M 0.1W
3553	319802156840	680 k 0.1W
3554	319802154740	470 k 0.1W
3555	319802154720	4.7 k 0.1W
3556	212255100008	VDR MAX 21V
3557	319802151050	1 M 0.1W
3558	319802156840	680 k 0.1W
3559	319802154740	470 k 0.1W
3560	319802154720	4.7 k 0.1W
3561	319802157590	75 R 0.1W
3562	319801101510	150 R 0.17W
3564	319802151030	10 k 0.1W
3900	319802190020	CHIP JUMPER
4507	319802190020	CHIP JUMPER

COILS

5551	242253594339	150 µH
5552	319801811010	100 µH
5553	242253594339	150 µH

DIODES

6551	319801021290	BZX79-C12
6552	319801021290	BZX79-C12
6553	319801026880	BZX79-C6V8
6554	319801026880	BZX79-C6V8
6555	934025530115	BAS216
6556	934025530115	BAS216
6557	319801026880	BZX79-C6V8
6558	319801026880	BZX79-C6V8
6570	933845770682	LED RED TLHR4205

TRANSISTORS

7551	319801042040	BC847C
7552	319801042040	BC847C

CABLES

		4822 320 50377	ANTENNA cable
		4822 321 63002	SCART cable
	⚠	4822 321 10249	SBC1201 MAINS CABLE
	⚠	4822 321 10886	MAINS CABLE UK
		4822 320 50377	CONNECT. CABLE PAL
		4822 321 63002	SCART CABLE(PROJ.50)
		4822 321 62401	AUDIO-CABLE
8001		4822 320 11889	FFC TD1-1961
8003		4822 320 12453	FFC 3POL TD3-1947
8004		4822 320 12454	FFC 6POL TD4-1948
8011		4822 320 12455	FFC 7POL 1982-1956
8012		4822 320 12453	FFC 3POL TD3-1947
8013		4822 320 12461	FFC 1961-1102
8014		4822 320 12456	FFC 3POL 1929-1922
8018		4822 320 12458	FFC 17POL 1915-1942
8020		4822 320 12459	FFC 14POL 1944-1920
8024		3103 140 27540	FFC 6POL 1923-keyPCB

REPAIR KITS

4822 310 11237	POWER SUPPLY REPAIR KIT

⚠... Safety component, use only this type

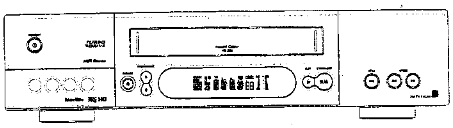
Video Cassette Recorder **Deck: Turbo Drive** **APOLLO 20**

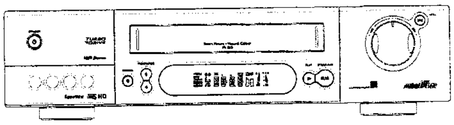
Service
Service
Service

V23370

VR800/02/07/16/39/58
VR805/071/161/391
VR850/02/07/16/39/58

VR806





Service Manual

Evolution: AA

Contents

Chapter

1 Table of contents per page
Survey of features
Survey of PCBs and PCB location
Technical data
Safety instructions
Supplementary service information
Front/rear view of the video recorder
Description of the controls and connections and direction for use

2 Error diagnosis system
Servicing of SMD's
Dismantling of the set
Circuit description

3 Electrical adjustment instructions
Survey of abbreviations used
Wiring diagram
Block diagram
PCB layout
Circuit diagrams
Measurements

4 Tape deck documentation
Adjustments
Exploded view of the tape deck
Parts list tape deck

5 Cabinet exploded view
Parts lists cabinet and PCB's

Survey of types:

VR800, VR805: Longplay, FM Audio
VR850: Longplay, FM Audio, Jog/Shuttle

Survey of versions:

/02	PAL B/G German Stereo
/07/071	PAL I, NICAM
/16/161	PAL B/G, NICAM & German Stereo
/39/391	PAL B/G & SECAM L, NICAM
/58	PAL B/G & SECAM BG/DK

Survey of remote controls:

VR800:	english:	RT188/101	4822 219 10561
	french (/39):	RT188/104	4822 219 10562
VR805:	english:	RT198/101	4822 219 10584
	french (/391):	RT198/104	4822 219 10583
VR850:	english:	RT587/101	4822 219 10563
	french (/39):	RT587/104	4822 219 10564

Survey of tape decks:

VR800, VR805:	WDQ-S4/2	4 Video+ 2 FM-Audio heads
VR850:	WDQ-S4/2 S	4 Video+ 2 FM-Audio heads, Jog/Shuttle

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

Published by GH9868 Videq Service Department Printed in the Netherlands © Copyright reserved Subject to modification (GB) 4822 726 15538

PCS 93695 GB

PHILIPS

Table of contents

Page

Chapter 1
TECHNICAL DATA AND FEATURES

Front page ... 1-1
Table of contents ... 1-2
Survey of sets and features ... 1-3
Survey of sets and PCBs, Technical specifications ... 1-4
Description of the system for publication of changes ... 1-5
Safety instructions ... 1-6/7
Survey of direction for use ... 1-8
Direction for use ... 1-9

Chapter 2
TOOLS FOR ERROR DIAGNOSIS

Dismantling of the set ... 2-1/3
Servicing of SMDs ... 2-4/5
Error diagnosis system ... 2-6/15
Circuit descriptions ... 2-16

Chapter 3
PRINTED BOARDS

Adjustment procedures ... 3-1/5
List of abbreviations ... 3-6
Wiring diagram ... 3-7
Block diagram Video ... 3-8/9
Block diagram Audio ... 3-10
Block diagram Digital ... 3-13
Block diagram power part ... 3-14/15

Power supply ASM

PCB drawing ASM ... 3-16
Circuit diagram ASM ... 3-17

Mother Board

PCB drawing Mother Board ... 3-18/21
Circuit diagram (PS) ... 3-22
Circuit diagram Front End (FV) ... 3-24
Circuit diagram Stereo Decoder (FM_STEREO) ... 3-25
Audio FM (AF) circuit diagram ... 3-26
Circuit diagram Erase Oscillator (ER) ... 3-27
Audio linear-AL circuit diagram ... 3-28
Video Signal Processing (VS) circuit diagram ... 3-31
Head Amplifier (HA) circuit diagram ... 3-32
SECAM Processing (VS_SEC) circuit diagram ... 3-35
Chroma Noise Reduction (CNR) circuit diagram ... 3-36
In/Out (IO)circuit diagram ... 3-37
Central Control (AIO1) circuit diagram ... 3-38
Port Expander (PE) circuit diagram ... 3-40
Central Control (AIO2) circuit diagram ... 3-41
Deck Electronics (DE) circuit diagram ... 3-42
Circuit diagram FOME, FF ... 3-44
On Screen Display/VPS/PDC (VPO) circuit diagram ... 3-45

Nicam Decoder QNIC

Circuit diagram QNIC ... 3-46
PCB drawing QNIC ... 3-47

Page

Display Control ADCP3

PCB drawing ADCP3 ... 3-48
Circuit diagram ADCP3 (DC) ... 3-49

Keyboard PCB AKP31

PCB drawing, Circuit diagram AKP31 ... 3-50

Connector PCB ACP3

PCB drawing ACP3 ... 3-50
Circuit diagram ACP3 ... 3-51

Chapter 4
TAPE DECK

Deck parts replacement

Auxiliary tools for deck adjustment ... 4-1
Deck layout diagrams ... 4-2
Lift ... 4-2
Head disc ... 4-3
A/C Head ... 4-4
Threading motor ... 4-4
Capstan motor ... 4-4
Pressure roller ... 4-4
Roller unit right ... 4-4
Roller unit left ... 4-5

Adjustments

Tape path ... 4-5
„Roller unit left; roller unit right“ ... 4-5
A/C Head ... 4-5
Horizontal distance ... 4-6
Brake band ... 4-6
Tape tension adjustment ... 4-6
Friction clutch control ... 4-6
Reverse brake control ... 4-6
Top view, Underside view ... 4-7

Exploded view

Cleaning and lubrication ... 4-8/9
Parts list ... 4-10

Chapter 5
PARTS LIST

Exploded view of cabinet parts ... 5-2
Cabinet parts ... 5-3
Power supply ... 5-4
Mother Board ... 5-5/11
Nicam Decoder QNIC ... 5-12
Display Control ADCP3, AKP31 ... 5-12
Connector PCB ACP3 ... 5-13
Complete PCBs, Cables ... 5-14

Features

Specification Items	VR800/02	VR800/07	VR800/16	VR800/39	VR800/58	VR805/071	VR805/161	VR805/391	VR850/02	VR850/07	VR850/16	VR850/39	VR850/58
Backup Clock	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs	7hrs
Tuning - presets	99	99	99	99	99	99	99	99	99	99	99	99	99
Reception													
PAL B/G	✔		✔	✔	✔		✔	✔	✔		✔	✔	✔
PAL I		✔		✔		✔		✔		✔		✔	
PAL D/K					✔								✔
SECAM L/L'				✔				✔				✔	
SECAM BG				✔	✔			✔				✔	✔
SECAM DK					✔								✔
German Stereo	✔		✔	✔	✔		✔	✔	✔		✔	✔	✔
NICAM		✔	✔	✔	✔	✔	✔	✔		✔		✔	✔
Rec/Pb PAL	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Rec/Pb SECAM				✔				✔				✔	
Rec/Pb MESECAM				✔	✔			✔				✔	✔
NTSC Playback	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Modulator	Pal G	Pal I	Pal G	-	Pal G/K	Pal I	Pal G	-	Pal G	Pal I	Pal G	-	Pal G/K
Auto Search	✔		✔	✔	✔		✔	✔	✔		✔	✔	✔
Auto Install		✔				✔				✔			
Guide Channel Mapping	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Time/Date Download	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Microphone in									✔	✔	✔	✔	✔
Headphone Out									✔	✔	✔	✔	✔
Synchro edit	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Auto Tape Length Recognition	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Wind/Rew. Time (E180)	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s	90s
VISS	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Studio Picture Control	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Natural Colour	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Smart Picture									✔	✔	✔	✔	✔
VPS/PDC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
ShowView	✔		✔	✔	✔		✔	✔	✔		✔	✔	✔
VideoPLUS +		✔				✔				✔			
Rec.Prep. Mode Scart 1/2	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Audio Dubbing	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NexTView Link (pin 10)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

PCBs & Tape Decks

	POWER SUPPLY	*MOTHER BOARD*	*NICAM BOARD*	*DISPLAY CONTROL*		*TAPE DECK*	
page 3-	16	18-45	46	48	50		
	ASM1	AMB	QNIC (ANIC)	ADCP3	ACP3	WDQT-S4/2	WDQT-S4/2S
VR800/02	●	●		●	●	●	
VR800/07	●	●	●	●	●	●	
VR800/16	●	●	●	●	●	●	
VR800/39	●	●	●	●	●	●	
VR800/58	●	●	●	●	●	●	
VR805/071	●	●	●	●	●	●	
VR805/161	●	●	●	●	●	●	
VR805/391	●	●	●	●	●	●	
VR850/02	●	●		●	●		●
VR850/07	●	●	●	●	●		●
VR850/16	●	●	●	●	●		●
VR850/39	●	●	●	●	●		●
VR850/58	●	●	●	●	●		●

GB

Technical Data

D

Technische Daten

F

Caractéristiques

Mains voltage	Netzspannung	Tension secteur	220 – 240 V
Mains frequency	Netzfrequenz	Fréquence	47 – 63 Hz
Power consumption:	Leistungsaufnahme:	Puissance absorbée:	16 W during operation
with Low Power Standby	Standby mit geringem Verbrauch	avec la fonction veille faible consommation	< 4 W
Ambient temperature	Raumtemperatur	Température ambiante	+10°C to +35°C
Relative humidity	Relative Luftfeuchtigkeit	Humidité relative	20 – 80 %
Weight	Gewicht	Poids	4.3 kg
Fast forward/rewind time	Vor-/Rückspulzeit	Temps (re-)bobinage	typ. 95s (E180 cass.)
Position of use	Betriebslage	Position d'emploi	horizontally, max. 15°
Video resolution	Video-Auflösung	Résolution vidéo	≥ 240 lines VHS
Audio	Audio	Audio SP:	80Hz – 10kHz (±8dB)
		Audio LP:	80Hz – 5kHz (±8dB)
		FM Audio:	20Hz – 20kHz (±3dB)

NL

Technische Gegevens

E

Datos Tecnicos

I

Dati Tecnici

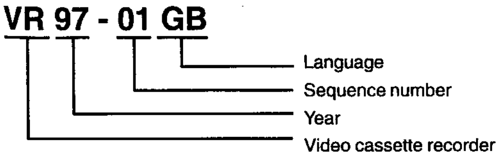
Netspanning	Tensión de red	Tensione di alimentazione	220 – 240 V
Netfrequentie	Frecuencia de red	Frequenza di rete	47 – 63 Hz
Opgenomen vermogen:	Consumo de potencia:	Potenza assorbita:	16 W during operation
met Low Power Standby	con standby de bajo consumo	in attesa a basso consumo	< 4 W
Omgevingstemperatuur	Temperatura ambiente	Temperatura ambiente	+10°C to +35°C
Relatieve vochtigheid	Humedad relativa	Umiditá relativa	20 – 80 %
Gewicht	Peso	Peso	4.3 kg
Vooruit/terugspoeltijd	tiempo de (re-)bobinado	Tempo di (ri-)avvolgimento	typ. 95s (E180 cass.)
Gebruikspositie	Posición de uso	Posizione di funzionamento	horizontally, max. 15°
Opplossend vermogen	Resolución video	Risoluzione video	≥ 240 lines VHS
Audio	Audio	Audio SP:	80Hz – 10kHz (±8dB)
		Audio LP:	80Hz – 5kHz (±8dB)
		FM Audio:	20Hz – 20kHz (±3dB)

Modifications

Description of the system used for publishing modification data and supplements to the service manual.

All modification data and supplements to the Service Manual are published by means of Service Information bulletins.

Each Service information has a number, for example :


VR 97 - 01 GB
Language
Sequence number
Year
Video cassette recorder

A Service Information bulletin concists of a front sheet, as the case may be followed by supplementary and/or replacement sheets.

Replacement sheets serve to replace existing sheets in the Service Manual. These sheets are identified by an additional letter after the page number, for example 5-1a. Page 5-1a then takes the place of page 5-1.

Supplementary sheets are inserted between the existing sheets in the Service Manual. These sheets can be identified by an additional figure following the page number, for example 5-1-1.

Sheet 5-1-1 should be inserted after page 5-1.

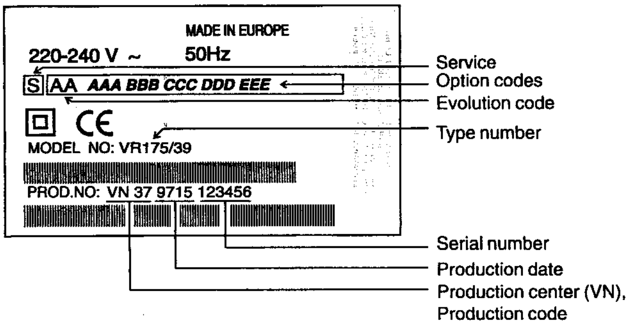
Description of the system by means of which modifications are indicated in the recorder.

All important parts of the recorder, such as tape deck, p.c. boards and modules, are provided with a sticker. These stickers specify a number of product data. The meaning of this data will now be explained for the most important sections.

The complete recorder

The type plate is located at the back of the recorder, below an example of such a type plate is given.

Type plate :

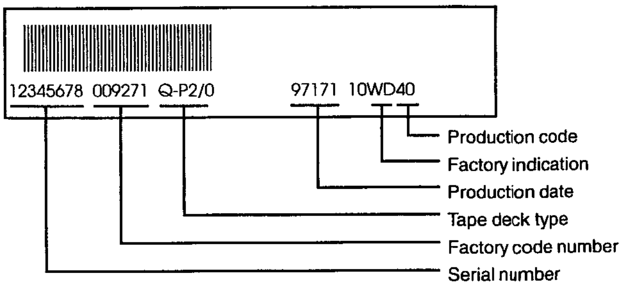

MADE IN EUROPE
220-240 V ~
50Hz
S
AA AAA BBB CCC DDD EEE
CE
MODEL NO: VR175/39
PROD.NO: VN 37 9715 123456
Service
Option codes
Evolution code
Type number
Serial number
Production date
Production center (VN),
Production code

Note :

- In the case of an important modification to the recorder the production code on the type plate is increased by one.
  E.g. 37 becomes 38.

- In the case of an important modification to the service documentation the evolution code on the type plate is increased by one.
  E.g. AA becomes AB.

Tape deck


12345678 009271 Q-P2/0 97171 10WD40
Production code
Factory indication
Production date
Tape deck type
Factory code number
Serial number

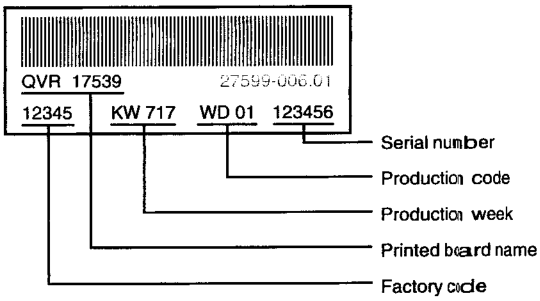
Note :

The production code and the serial number on the tape deck need not correspond to the production code and the serial number on the type plate.

Printed panels

The stickers are generally located on the track side of the module.

Example :


QVR 17539
27599-006.01
12345
KW 717
WD 01
123456
Serial number
Production code
Production week
Printed board name
Factory code

Remarks :

The production code number will not always be mentioned.

In case of an important modification, the last figure of the factory code number (point number) is increased by one. E.g. 6635.1 becomes 6635.2.

Safety instructions

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.

  Safety components are marked by the symbol ⚠

- All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair may reduce life drastically. When repairing, make sure that you are conneted with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools on the same potential.
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- Never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to prelude short-circuit or to prevent a specific circuit from being rendered unstable.

Remarks

- The direct voltages and oscillograms ought to be measured relative to the set mass.
  EXCEPTION
  At the power supply, the DC voltages and the oscillograms at the primary side are measured to LIVE GND.
- The direct voltages and oscillograms mentioned in the diagrams ought to be measured with a colour bar signal and the picture carrier at 503.25 MHz (C25).
- The oscillograms and direct voltages have been measured in RECORD or PLAY mode.
- The semiconductors, which are mentioned in the circuit diagram and in the parts lists, are fully exchangeable per position with the semiconductors in the set, irrespective of the type designation of these semiconductors.

Sicherheitshinweise

- Die Sicherheitsvorschriften erfordern es, daß sich das Gerät nach der Reparatur in seinem originalen Zustand befindet und daß die zur Reparatur benutzten Ersatzteile mit den Originalersatzteilen identisch sind.

  Sicherheits-Bauteile sind mit der Markierung ⚠ versehen

- Alle IC's und Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD). Unvorschriftmässige Behandlung von Halbleitern im Reparaturfall kann zur Zerstörung dieser Bauteile oder zu einer drastischen Reduzierung der Lebensdauer führen. Sorgen Sie dafür, daß Sie sich im Reparaturfall über ein Armband mit Widerstand auf dem gleichen Potential, wie die Masse des Gerätes befinden. Alle Bauteile, Werkzeuge und Hilfsmittel sind auf das gleiche Potential zu legen.
- Ein zu reparierendes Gerät ist immer über einen Trenntransformator an die Netzspannung anzuschließen.
- Bei eingeschaltetem Gerät dürfen keine Module oder sonstige Einzelteile ausgetauscht werden.
- Zum Abgleich sind ausschließlich Kunststoffwerkzeuge zu benutzen (keine Metallwerkzeuge verwenden). Dadurch wird vermieden, daß ein Kurzschluß entstehen kann oder eine Schaltung instabil wird.

Anmerkungen

- Die Gleichspannung und Oszillogramme sind gegen Gerätemasse zu messen.
  AUSNAHME
  Beim Netzteil sind die Gleichspannungen und Oszillogramme auf der Primärseite gegen Live GND gemessen.
- Die Gleichspannungen und Oszillogramme angeführt in den Schaltbildern sollen unter folgenden Bedingungen gemessen werden: Farbbalkensignal, Bildträger auf 503.25 MHz (C25)
- Die Oszillogramme und Gleichspannungen sind in RECORD oder PLAY gemessen. Die in den Stücklisten aufgeführten Bauteile sind positionsweise voll auswechselbar gegen die Bauteile in dem Gerät, ungeachtet der etwaigen Typenbezeichungen.

Avertissements

- Les normes de sécurité exigent qu'aprés réparation l'appareil soit remis dans son état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées.

  Les composants de sécurité sont marqués ⚠

- Tout les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharger statiques (ESD). Leur longévité pourrait étre considérablement écourté par le fait qu'aucune précaution n'est prise à leur manipulation. Lors de réparations s'assurer de bien étre relié au méme potential que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.
- Toujours alimenter un appareil à réparer à travers un transfo d'isolement.
- Ne jamais remplacer les modules ni d'autres composants quand l'appareil est sous tension.
- Pour l'ajustage, utiliser des outils en plastique au lieu d'instruments métalliques. Ceci afin d'éviter les court-circuits et exclure l'instabilité dans certains circuits.

Observations

- La mésure des tensions continues et des oscillogrammes doit se faire par rapport à la terre de l'appareil.
  EXCEPTION
  Sur l'unité d'alimentation la tension continue et l'oscillogramme sont mesurés sur le côte primaire en Live GND.
- La mésure des tensions continues et des oscillogrammes figurant sur le schéma doit se faire dans un signal de barre couleur porteuse image sur 503.25 MHz (C25).
- Les oscillogrammes et tension sont mésurées en mode RECORD ou PLAY.
- Les semi-conducteurs indiqués dans le schéma de principe et à la liste des compostants, sont interchangeables par repère sur ce chassis avec les semi-conducteurs de l'appareil quelle que soit la désignation de type donnée sur ces semi-conducteurs.

Veiligheidsinstructies

- Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, indentiek aan de oorspronkelijke, worden toegepast.

  De veiligheidsonderdelen zijn aangeduid met het symbool ⚠

- Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor, dat U tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.
- Sluit een apparaat dat gerepareerd wordt altijd via een scheidingstransformator aan op de netspanning.
- Verwissel nooit modules of andere onderdelen terwijl het apparaat is ingeschakeld.
- Gebruik voor het afregelen plastic i.p.v metalen gereedschap. Dit om mogelijke kortsluiting te voorkomen of een bepaalde schakeling instabiel te maken.

Opmerkingen

- De gelijksspanningen en oscillogrammen dienen gemeten te worden ten opzichte van de apparaat aarde.
- De gelijksspanningen en oscillogrammen vermeld in de schema's dienen gemeten te worden met een kleurbalkensignaal beelddraaggolf op 503.25 MHz (C25).
- De oscillogrammen en gelijksspanningen zijn in RECORD of PLAY mode gemeten.
- De halfgeleiders, die in het pricipeschema en in de stuklijsten, zijn vermeld, zijn per positie volledig uitwisselbaar met de halfgeleiders in het apparaat, ongeacht de typeaanduiding op deze halfgeleiders.

Avvertimenti

- Le prescrizioni di sicurezza richiedono che l'apparecchio sia ricondotto alle condizioni originali e che siano usati ricambi originali.

  Componenti di sicurezza sono marcati con ⚠

- Tutti gli IC e semiconduttori sono sensibili a scariche elettrostatiche (ESD). Noncuranze durante la riparazione di semiconduttori possono danneggiarli o condurre ad una riduzione drastica della durata. Durante la riparazione assicurarsi di essere collegati allo stesso potenziale attraverso un bracciale di protezione contro scariche elettrostatiche. Inoltre tenere anche tutti i componenti e gli attrezzi a questo potenziale.
- Apparecchi da riparare bisogna collegarli sempre via un trasformatore isolante (separatore) alla tensione normale.
- Non scambiare moduli o altri componenti quando l'apparecchio è in funzione.
- Per l'accordo usare soltanto attrezzi di plastica (non usare attrezzi metallici). Cosí si evitano cortocircuiti e collegamenti instabili.

Osservazioni

- Misurare le tensioni continue e gli oscillogrammi riferiendosi alla massa dell'apparecchio.
  ECCEZIONE
  Le tensioni continue e gli oscillogrammi dall'alimentatore sono misurati sulla parte primaria contro GND-Live.
- Le tensioni continue e gli oscillogrammi indicati negli schemi di collegamento devono essere misurati secondo le condizioni seguenti: segnale barre colore, portante dell'immagine su: 503.25 MHz (C25).
- Gli oscillogrammi e le tensioni continue sono misurati in RECORD o PLAYBACK.
- I componenti indicati nelle liste sono intercambiabili con quelli nell'apparecchio nonostante l'eventuale denominazione di modelli.

Avisos

- Las instrucciones de seguridad exigen que después de la reparación el aparato se encuentre en el estado original y que las piezas de repuesto, utilizadas para la reparación, sean idénticas a las originales.

  Los componentes de seguridad estan marcados con ⚠

- Todos los IC y semiconductores son sensibles a descargas electrostáticas (ESD). Un tratamiento no conforme a las instrucciones de semiconductores en caso de reparación, podría llevar a la destrucción de estos componentes, o a una reducción drástica de la duración. Tenga cuidado de que, en caso de reparación, estar al mismo potencial que la masa del aparato, por una pulsera con resistencia. Ponga todos los componentes, herramientas y recursos al mismo potencial.
- Para reparar un aparato hay que conectarlo siempre a la alimentación a traves de un transformador de aislamiento.
- Cuando un aparato está en marcha no pueden ser cambiados módulos u otras piezas de repuesto.
- Para los ajustes hay que utilizar exclusivamente herramientas de plástico (nunca herramientas metálicas). Así se evitaran cortocircuitos y circuitos inestables.

Notas

- Hay que medir las tensiones continuas y los oscilogramas contra la masa del aparato.
  UITZONDERING:
  Bij het netgedeelte zijn de gelijkspanningen en oscillogrammen aan de primaire kant tegen Live GND gemeten.
- Las tensiones continuas y los oscilogramas mencionados en los esquemas tienen que ser medidos de manera siguiente: señal barra de color portadora de imagen en 503.25MHz (C25)
- Los oscilogramas y las tensiones continuas son medidas en „RECORD“ y „PLAYBACK“
- Los componentes mencionados en las listas se los puede cambiar por los componentes en el aparato, a pesar de eventuales designaciones de tipos.

OPERATING INSTRUCTIONS

1. **INSTALLATION 1-11**

Connecting to theTV-set 1-11
AutomaticTV Channel Search 1-11
AutomaticTV ChannelAllocation (FOLLOWTV) 1-12
Connecting a decoder or additional equipment 1-12
ManualTV Channel Search 1-12
Monitor function 1-13
Sort/ClearTV Channels manually 1-13
Setting the language 1-13
Setting the clock and the date 1-13
User guide (OSD) 1-13
Emergency interrupt 1-14
Saving energy 1-14

2. **PLAYBACK 1-14**

Playback a cassette 1-14
Searching for tape position 1-14
The JOG/SHUTTLE functions 1-14
Selecting the picture setting (SMART PICTURE) 1-15
Eliminating picture interference 1-15

3. **MANUAL RECORDING 1-16**

Recording with/without automatic switch-off 1-16
Automatic recording from a satellite receiver (SAT RECORDING) 1-16
Direct Record 1-16

4. **AUTOMATIC (PROGRAMMED) RECORDING 1-17**

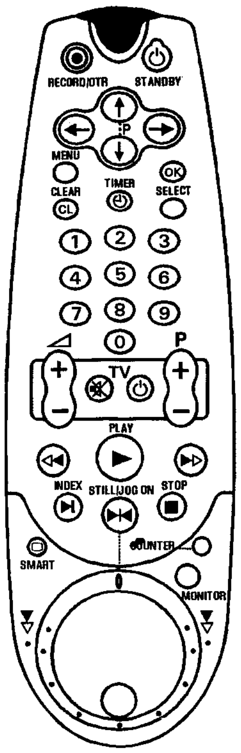
'VPS' (Video Programming System) / 'PDC' (Programme Delivery Control) 1-17
Programming with 'SHOWVIEW' 1-17
Manual recording without 'SHOWVIEW' 1-18
How to check or alter aTIMER 1-18
'NexTView Link' 1-18

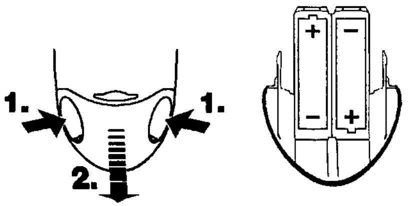
5. **ADDITIONAL FUNCTIONS 1-19**

Changing theTV system 1-19
Child lock 1-19
Switching the remote control command 1-19
Continuous playback 1-19
The automatic switch-off 1-20
Remote control ofTV sets 1-20
Audio dubbing 1-21
Selecting the sound track 1-21
Synchronous editing (synchro-edit) 1-21

OPERATING INSTRUCTIONS IN BRIEF

The remote control



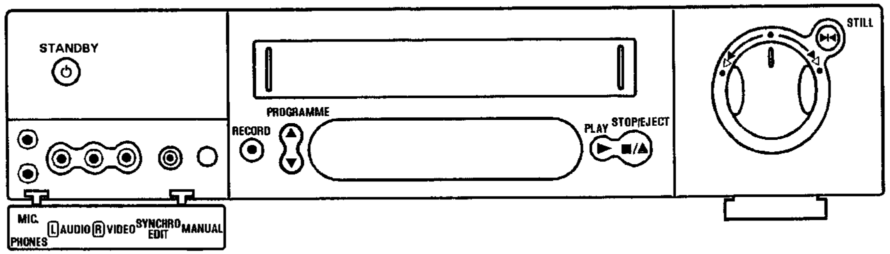


●RECORD/OTR	**Record/OTR**: Direct recording of the programme selected at this moment
⏻STANDBY	**Switch off**: Switch off set, interrupt menu function, interrupt TIMER-recording
P↑	**Programme/Menu button**: Programme number plus/Cursor up
P↓	**Programme/Menu button**: Programme number minus/Cursor down
←	**Menu button**: Cursor left
→	**Menu button**: Cursor right
MENU	**Menu button**: Call up main menu/End
OK	**Store/Confirm**: Store/Confirm entry
CLEAR (CL)	**Delete**: Delete last entry/Clear TIMER
TIMER ⏲	**TIMER**: Manual TIMER programming or alter/clear a programmed TIMER
SELECT	**Select**: Function selector
0-9	**Digit buttons**: 0 - 9
◁◀	**Rewind**: During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning
PLAY▶	**Playback**: Playback a recorded cassette
▷▷	**Forward wind**: During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning
INDEX▶|	**Index search**: In combination with ◁◀ / ▷▷ , search for previous/next recording-index on the tape
STILL/JOG ON▶◀	**Still picture/JOG on**: Stop the tape and display the actual position on the tape as a still picture/switch on the 'JOG' function
STOP■	**Pause/Stop**: Stop the tape, except during TIMER-recording
SMART▢	**SMART**: Adjust the picture setting during playback
COUNTER	**Counter**: Select display of tape positon
MONITOR	**TV monitor**: Switch between TV reception and VCR playback
-⊙+	**SHUTTLE**: During STILL, select picture search speed with the outer dial (shuttle)
⊙	**JOG**: During STILL picture, select single picture with the inner dial (jog)

Additional TV-function

◺+/−	**TV volume**: TV volume up/down
TV⏻	**Switch off**: Switch off TV
TV🔇	**TV sound off**: Switch off/on sound completely
P+/−	**TV Programme**: TV programme number up/down

Front of the set

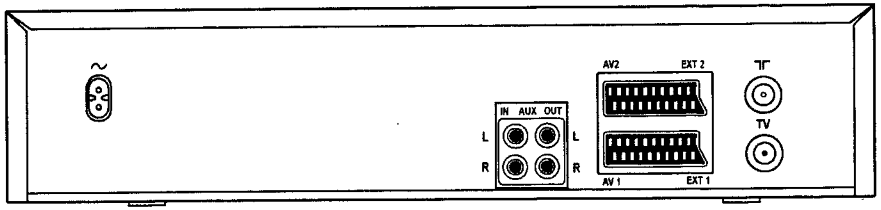


STANDBY ⏻	**Standby** : Switch off, interrupt function, interrupt TIMER recording
RECORD ●	**Record**: Record the programme selected at this moment
PROGRAMME ↑	**Programme number Plus**: Programme number up
PROGRAMME ↓	**Programme number Minus**: Programme number down
PLAY ▶	**Playback** : Playback a recorded cassette
STOP/EJECT ■/▲	**Pause/Stop**: Stop the tape, except during TIMER-recording
STILL ▶◀	**Still picture**: Stop the tape and display the actual position on the tape as a still picture
-◎+	**Rotary control**: turn left: during STOP and STANDBY: rewind, during PLAYBACK: reverse scanning turn right: during STOP and STANDBY: wind, during PLAYBACK: forward scanning

Behind the flap at the lefthand corner on the front:

MIC.	**Microphone input socket**: To connect a microphone for dubbing (programme number 'MIC')
PHONES	**Headphones socket**: To connect headphones
L-AUDIO-R	**Audio input socket left/right** : To connect a camera recorder or video recorder (programme number 'E3')
VIDEO	**Video input socket** : To connect a camera recorder or video recorder ('E3')
SYNCHRO EDIT	**EDIT input socket** : To connect a suitable camera recorder
MANUAL	**Manual sound control** : To switch between automatic sound control and manual sound control

Back of the set



~	**Mains socket**: To connect the mains cable
AUX IN L R	**Audio input socket, left/right** : To connect a HiFi-set (programme number 'AUX')
AUX OUT L R	**Audio output socket, left/right** : To connect a HiFi-set.
AV2 EXT2	**Scart socket 2**: To connect a satellite receiver, decoder, video recorder, etc. (programme number 'E2').
AV1 EXT1	**Scart socket 1**: To connect the TV set (programme number 'E1').
⊤⊤	**Aerial input socket**: To connect the aerial cable
TV	**Aerial output socket**: To connect the TV set

1. INSTALLATION

Connecting to the TV-set

When you install your Video recorder for the first time, please read:

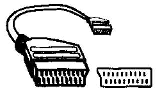
☐ the paragraph 'Connecting with scart cable and Easy Link/NexTView', when your TV-set is equipped with 'Easy Link/NexTView'.

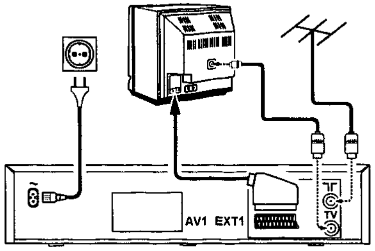
☐ the paragraph 'Connecting with scart cable without Easy Link/NexTView', when your TV-set is not equipped with 'Easy Link/NexTView'.

☐ the paragraph 'Connecting without a scart cable', when you do not use a scart cable.

Connecting with scart cable and 'Easy link/NexTView'

With the function 'Easy Link/NexTView', your video recorder can exchange information with the television. Heed the operating instruction of your television.
With 'Easy Link/NexTView' the TV channels from the TV will automatically be loaded.





1 Remove the aerial cable plug from your TV set and insert it into the ⊤⊤ socket at the back of the video recorder.

2 Plug one end of the aerial cable provided into the TV socket on the video recorder and the other end into the aerial input socket on your TV set.

3 Plug one end of the special scart cable provided into the AV1 EXT1 scart socket at the back of the video recorder and the other end into the scart socket on your TV set.

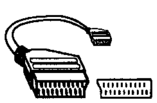
4 Switch on the TV set.

5 Insert one end of the mains cable into the mains socket ∼ at the back of the video recorder and the other end into the wall socket.

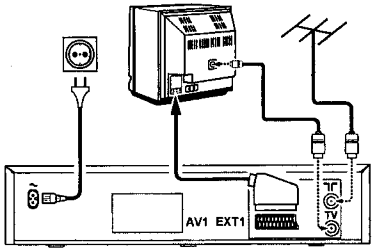
6 The video recorder will automatically load all TV channels stored on your TV, in the same sequence.
This may take several minutes.
When all data (TV channels, language, country) has been copied, the following text appears on the TV screen:
'EASY LINK LOADING COMPLETE'.

7 Check if clock and date are correct. Read the paragraph 'Setting Time/Date' in this chapter.

Connecting with scart cable without 'Easy Link/NexTView'



If your television **does not have a scart (EURO-AV) socket,** please **do not read further here,** but turn to the next paragraph 'Connecting without scart cable'.



1 Remove the aerial cable plug from your TV set and insert it into the ⊤⊤ socket at the back of the video recorder.

2 Plug one end of the aerial cable provided into the TV socket on the video recorder and the other end into the aerial input socket on your TV set.

3 Plug one end of the scart cable into the scart socket AV1 EXT1 on the back of the video recorder and the other end into the scart socket on your TV set.

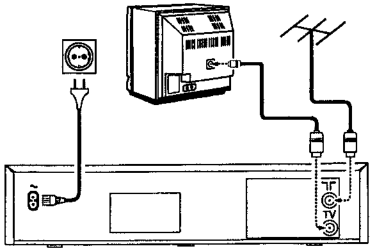
4 Switch on the TV set.

5 Insert one end of the mains cable into the mains socket ∼ at the back of the video recorder and plug the other end into the wall socket.

6 When your TV set **automatically switches** to programme number e.g.: 'EXT', '0', or 'AV', a welcoming text appears on the TV screen.
When your TV set does not switch automatically, select the required programme number manually (see instruction manual TV set).

7 Subsequently, read the paragraph 'Initial Installation' in the section 'Automatic TV Channel Search'.

Connecting without scart cable



1 Remove the aerial cable plug from your TV set and insert it into the ⊤⊤ socket at the back of the video recorder.

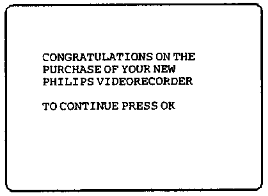
2 Plug one end of the aerial cable provided into the TV socket on the video recorder and the other end into the aerial input socket on your TV set.

3 Insert one end of the mains cable into the mains socket ∼ at the back of the video recorder and plug the other end into the wall socket.

4 Switch on your TV set and select the programme number that you have chosen for video playback (see operating manual for your TV set).

5 The video recorder will now send a welcoming text on UHF-channel CH36or 591MHz.

6 Tune in the TV set in the UHF wave band until this picture appears.



CONGRATULATIONS ON THE
PURCHASE OF YOUR NEW
PHILIPS VIDEORECORDER

TO CONTINUE PRESS OK

7 Subsequently, read the paragraph 'Initial Installation' in the section 'Automatic TV Channel Search'.

Automatic TV Channel Search

Initial installation

1 Press the OK button.

2 Select your language with the menu buttons P↓ or P↑ and confirm with the OK button.

3 Select your country with the menu buttons P↓ or P↑.
If your country is not displayed, select 'OTHERS'.
Confirm with the OK button.

4 If the aerial has been connected to the video recorder, press the OK button.
'Automatic TV Channel Search' starts.

5 When all TV channels have been found, 'AUTOMATIC SEARCH COMPLETE' appears on the TV screen.

☐ 'TIME', 'YEAR', 'MONTH', 'DATE' appear on the TV screen.

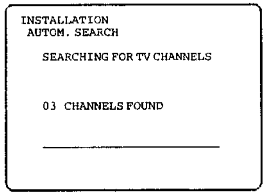
6 If required, adjust 'TIME', 'YEAR', 'MONTH', 'DATE' with the digit buttons 0-9. To select between the fields, use the menu butons P↓ or P↑. Confirm each entry with the OK button.

7 To end, press the MENU button.

How to search for a TV channel manually, you can read in 'Manual TV Channel Search'.

Successive Installation

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'AUTOM. SEARCH' with the [P↓] or [P↑] menu button.
5. Press the [→] button. The 'Automatic TV Channel Search' starts.



```
INSTALLATION
 AUTOM. SEARCH

   SEARCHING FOR TV CHANNELS


   03  CHANNELS FOUND
```

6. When the TV channel search is complete, 'AUTOMATIC SEARCH COMPLETE' will appear on the screen.
7. To end, press the [MENU] button.

How to search for a TV channel manually, you can read in the section 'Manual Channel Search'.

Automatic TV Channel Allocation (FOLLOW TV)

With this function the video recorder maintains the same channel sequence as on the TV set, in case you connected your videorecorder to a TV set **without scart cable**. This only functions if the video recorder (socket [AV1 EXT1]) and the TV set are **connected with a scart cable.** Additional equipment connected to socket [AV2 EXT2] must be **switched off**.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View', this function will start the data transfer.

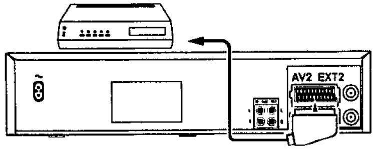
1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons *[P↓] or [P↑] and confirm with the [→] button.*
4. Select the line 'FOLLOW TV' with the menu buttons [P↓] or [P↑] and confirm with the [→] button. Take notice of the message on the TV screen.
5. Press the [OK] button.
   If the video recorder recognizes that the TV set has been connected with a scart cable, 'TV' 01' appears in the display.
   - When 'NOTV' (no signal from TV set) appears in the display, the TV channels can not be allocated automatically. In this case, read paragraph: 'Manual TV Channel Number Allocation'.
6. Select programme number '1' **on the TV set**.
7. Confirm with the [OK] button on the video recorder-remote control. The video recorder compares the TV channels on the TV set and the video recorder.
   If the video recorder found the same TV channel as the TV set, then it stores it at 'P01'.
8. Wait until e.g.: 'TV' 02' appears.
9. Select the next programme number, e.g.: '2' **on the TV set** .
10. Confirm with the [OK] button on the video recorder-remote control.

▷ If you allocated the wrong TV channeL, you can go back one step with the menu button [←].

11. Repeat steps [8] to [10] until all TV channels have been allocated.
12. To finish, press the [MENU] button.

Connecting a decoder or additional equipment

You can also connect additional equipment to the [AV2 EXT2] socket. For instance: decoder, satellite receiver or camera recorder.
You can connect a HIFI-stereo set to the sockets [AUX OUT L R] (audio output left/right) and [AUX IN L R] (audio input left/right).



Allocating a decoder

With this function, the connected decoder will automatically be activated for the TV programme required.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View' the decoder must be activated for the TV set.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. On the video recorder, select the TV programme you wish to link with the decoder function, using the [P↑] or [P↓] button or the digit buttons [0-9].
3. Press the [MENU] button. The main menu appears.
4. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
5. Select the line 'MANUAL SEARCH' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
6. Select the line 'DECODER' with the menu buttons [P↓] or [P↑].
7. Select function 'ON' with the menu buttons [←] or [→]. When you select 'OFF', the function will be switched off.
8. Confirm with the [OK] button.

▷ When the function is switched on, 'DEC' appears in the display.

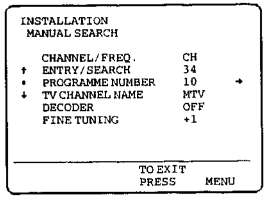
9. To end, press the [MENU] button.

Manual TV Channel Search

In certain cases the 'Automatic TV Channel Search' may not be able to find all of the TV channels (e.g. coded TV channels). In that case, use this manual method to set the channels.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View' the videorecorder automatically loads the TV channels from the TV set. Hence, some lines are not functional.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].
4. Select the line 'MANUAL SEARCH' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].



```
INSTALLATION
 MANUAL SEARCH

    CHANNEL/FREQ.          CH
 ↑  ENTRY/SEARCH           34
 •  PROGRAMME NUMBER       10       →
 ↓  TV CHANNEL NAME        MTV
    DECODER                OFF
    FINE TUNING            +1

___________________________________
                    TO EXIT
                    PRESS     MENU
```

5. In the line 'CHANNEL/FREQ.', select the display for:
   'FREQ.': frequency
   'CH': channel
   'S-CH': special channel
6. If you know the frequency or channel of the desired TV channel, you can enter the data in line 'ENTRY/SEARCH' with the digit buttons [0-9].
   - If you don't know the frequency or channel of the TV channel of your choice, press the menu button [→] to start the channel search.
7. In the line 'PROGRAMME NUMBER' select the programme number you want e.g.: '01', using the menu buttons [←] or [→].
8. If you want to change the TV channel name, press the [→] button in line 'TV CHANNEL NAME'.
   - Select the character you want to change with the [←] or the [→] button. Change the character with the [P↓] or the [P↑] button. Select the next character in the same way.
   - Keep pressing the menu button [→] until the cursor disappears.
9. If you want to change the automatic tv channel setting, select the line 'FINE TUNING'.
   With the menu buttons [←] or [→] you can vary the automatic tv channel setting. **Important:** This re-tuning is only necessary and useful in **special cases**, e.g.: when there are stripes on the picture with cable-TV systems.
10. Press the [OK] button to store the TV channel.
11. If you want to search for further TV channels, start again at step [6].
12. To end, press the [MENU] button.

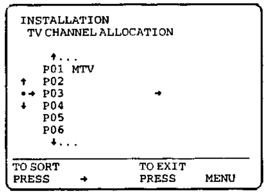
Monitor function

You can switch back and forth between TV reception and video recorder reception with the [MONITOR] button. This only functions when you used a scart cable to connect the video recorder to your TV set and if your TV set responds to this switch-over.

Sort/Clear TV Channels manually

▷ With 'Connecting with Easy Link/NexTView' the video recorder automatically loads the TV channels from the TV set. Hence, you can not select this function.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'TV CHANNEL ALLOCATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.



```
INSTALLATION
 TV CHANNEL ALLOCATION

     ↑...
    P01  MTV
↑   P02
•→  P03                →
↓   P04
    P05
    P06
     ↓...
──────────────────────────────
TO SORT            TO EXIT
PRESS     →        PRESS     MENU
```

5. With the menu buttons [P↓] or [P↑], select the TV channel to which you want to allocate a programme number (starting with 'P01' and press the [→] button.

▷ If you want to delete a TV channel, press the [CLEAR (CL)] button.

6. With the menu buttons [P↓] or [P↑], shift the TV channel to the programme number you wish to allocate to this TV channel and press the [←] button. The TV channel will *be added.*
7. Repeat steps [5] to [6] until you have allocated a *programme number to all TV channels.*
8. To store, press the [OK] button.
9. To end, press the [MENU] button.

Setting the language

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'LANGUAGE' and confirm with the [→] button.
5. Select your language with the [P↓] or [P↑] menu button and confirm with the [OK] button.
6. To end, press the [MENU] button.

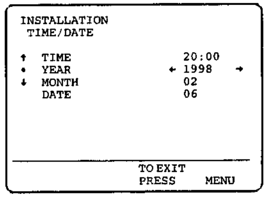
Setting the country

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'COUNTRY' and confirm with the [→] button.
5. Select your country with the menu buttons [P↓] or [P↑]. If your country doesn't show up, select 'OTHERS'.
6. Confirm with the [OK] button.
7. To end, press the [MENU] button.

Setting the clock and the date

If the time in the video recorder display is not correct or if '--:--' appears in the display, please set the clock manually.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'TIME/DATE' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.



```
INSTALLATION
 TIME/DATE

↑  TIME               20:00
•  YEAR             ← 1998   →
↓  MONTH              02
   DATE               06



──────────────────────────────
                   TO EXIT
                   PRESS     MENU
```

5. Adjust 'TIME', 'YEAR', 'MONTH', 'DATE' if required, using the digit buttons [0-9]. Switch between fields with the menu buttons [P↓] or [P↑].
6. Confirm each entry with the [OK] button.
7. To end, press the [MENU] button.

▷ If a TV channel which transmits TXT/PDC is stored with programme number 'P01', time (from TXT) and date (from PDC) will automatically be taken from the TXT/PDC information.

User guide (OSD)

With OSD (On Screen Display) the corresponding functions appear on the TV screen as a menu. The most important button-functions are displayed at the bottom of the screen.

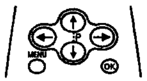
- ☐ **Call up the menu:** With the [MENU] button.
- ☐ **Select a line:** With the [P↓] or [P↑] button.
- ☐ **Select within a line:** With the menu buttons [←] or [→].

☐ **Enter/Alter:** With the ← or → or with the 0-9 button.

☐ **Store:** With the OK button.

☐ **Confirm:** With the menu button →.

☐ **Exit menu:** With the MENU button.



Emergency interrupt

Both the video recorder and the remote control have an 'Emergency interrupt' button. You can use the ⏻STANDBY button to interrupt any function.
Whenever you have operating problems you can simply interrupt the function and start again.
You can practise operating your set without any worries. No matter which buttons you press, you cannot damage it.

Important notes for operation

☐ You can switch on with the STOP■ button, the 0-9 buttons or by inserting a cassette.

☐ Keep your video recorder connected to the mains at all times to ensure that programmed recordings can be made and that the television functions normally. The power consumption required is less than 4W (saving energy mode).

☐ When the video recorder is disconnected from the mains, TV channels will be strored typically 1 year, and clock/timer data will be stored typically 7 hours.

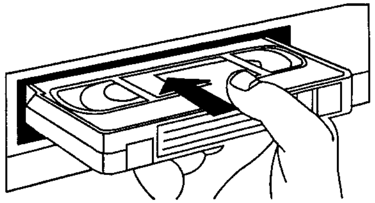
Saving energy

You can choose between two methods of switching to standby.
Normal method: Switch to standby using the ⏻STANDBY button. The clock time remains displayed.
If the clock has not been set, '--:--' appears.
To save energy: Press the ⏻STANDBY button twice. The clock time disappears from the display.

2. PLAYBACK

Playback a cassette

1 Insert a cassette into the cassette slot.



2 Press the PLAY► playback button.

3 To stop, press the STOP■ button.

4 To eject, Press the STOP/EJECT■/▲ button on the set.

▷ Some hired cassettes may have a poor picture/sound quality. This is not a fault in your set. Please read the section 'Selecting the picture setting (SMART PICTURE)', or 'Eliminating picture interference'.

▷ Some functions switch off automatically after a while (e.g.: Pause, Still Picture, Scanning). This helps to protect the cassette and prevent unnecessary power consumption.

NTSC Playback

With this set you can playback cassettes that have been recorded on another video recorder in the NTSC standard. This only works for PAL-television sets which are suitable for a picture frequency of 60 Hz.
During NTSC playback '60HZ' appears in the display.

▷ During NTSC-playback some special features (e.g. still picture) are not possible.

Tape position indication

1 During playback press the COUNTER button.

2 Select one of the following obtions:
'TIME USED' to indicate the time used on the tape
'TIME LEFT' to indicate the time left on the tape
'COUNTER' to indicate the actual position on the tape

▷ With the OK button, you can superimpose the actual tape position on the TV screen.

Searching for tape position with picture (picture search)

1 During playback, press the ◁◁ (reverse) or ▷▷ (forward) button once or several times.

2 To interrupt at the position required, press the PLAY► button.

▷ During picture search, the picture quality is affected and the sound is turned off.

The JOG/SHUTTLE functions

You will find a large rotary knob (Shuttle) -⊙+ both on the video recorder and the remote control.

1 Switch the function on with the STILL▶◀ button.
You will see a still picture.

2 Use the inner JOG disc on the remote control to select the next or previous still picture.

3 Turning the inner disc continuously to the right or to the left switches to slow motion, forward or reverse.

4 The outer SHUTTLE ring enables you to select different tape speeds for the forward or reverse picture search.

Searching for tape position without picture (wind/rewind)

1 Stop the tape with the STOP■ button.

2 Press the ◁◁ (reverse) or ▷▷ (forward) button. If you want to carry out this function on your video recorder, turn the outer rotary control (Shuttle) -⊙+ to the left or to the right.

3 To interrupt at the position required, press the STOP■ button.

Quick View

With this function you can switch to picture search during wind/rewind.

1. If you hold the [◄◄] (rewind) or [►►] (wind) button during wind or rewind, you will switch to picture search.
2. If you release the button, the video recorder will automatically switch back to rewind or wind.

Automatic search for tape position (Index search)

At the beginning of each recording, the video recorder marks the tape with a index code mark.

1. Press the [INDEX►I] button. Then press the [►►] button to select the next code mark or the [◄◄] button for the previous code mark.
2. When the video recorder finds the code mark or a blank space it will automatically switch to playback.

▷ You can only search for a blank space with recordings made on a video recorder that does not have this index code mark function.

Selecting the picture setting (SMART PICTURE)

During playback, you can change the picture setting:

1. During playback, press the [SMART▢] button. The current selection will be shown.
2. Press the [SMART▢] button repeatedly to select the required picture setting.
3. Confirm the new setting with the [OK] button.

This picture setting will remain until you eject the cassette.

Eliminating picture interference

When the picture quality is poor, please proceed as follows:

Tracking during playback

1. During playback, press the [MENU] button.
2. Select the line 'PLAY FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
3. Select the line 'MANUAL TRACKING' with the menu buttons [P↓] or [P↑].
4. Hold the menu buttons [←] or [→] until the playback quality is at its best.
5. Confirm with the [OK] button.
6. To end, press the [MENU] button. This setting will remain until you remove the cassette.

Tracking during still picture

If the still picture vibrates vertically, you can improve the still picture as follows:

1. During still picture, press the [MENU] button.
2. Select the line 'PLAY FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
3. Select the line 'VERTICAL STABILITY' with the menu buttons [P↓] or [P↑].
4. Hold the menu buttons [←] or [→] until the picture quality is at its best.
5. Confirm with the [OK] button.
6. To end, press the [MENU] button.

Cleaning the video heads

1. During playback, press the [MENU] button.
2. Select the line 'PLAY FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
3. Select the line 'HEAD CLEANING' with the menu buttons [P↓] or [P↑].
4. Press the [OK] button. 'HEAD CLEANING IN PROGRESS' appears on the screen.
5. Wait a few seconds, until the message disappears and then press the [MENU] button.

3. MANUAL RECORDING

Recording without automatic switch-off.

1 Insert a cassette.

2 Use the P↑ or P↓ button to select the programme number (programme name) from which you wish to record.

▷ When the function 'Direct record' is switched on, select the programme number on the TV set. With the video recorder **switched on**, press the ●RECORD/OTR button.

▷ When a TV channel transmits a channel name, it will show in the display.

▷ Programme numbers 'E1' and 'E2' are provided for recording from external sources (via scart sockets AV1 EXT1 and AV2 EXT2). Programme number 'E3' is provided for recording from the front sockets VIDEO and L-AUDIO-R.

▷ Programme numbers 'AUX' and 'MIC' are provided for audio recordings (via sockets AUX IN L R) and the microphone socket 'MIC'.

3 Press the ●RECORD/OTR button.

4 Stop recording with the STOP■ button.

Recording with automatic switch-off (OTR One-Touch-Recording)

1 Insert a cassette.

2 Use the P↑ or P↓ button to select the programme number (programme name) from which you wish to record.

3 Press the ●RECORD/OTR button.

4 Press the ●RECORD/OTR button repeatedly to obtain the required end time or length of the recording.

▷ To cancel this entry, press the CLEAR (CL) button.

Erase protection

So that you don't accidentally delete an important recording, remove the special tab (erase protection) on the narrow side of the cassette with a screwdriver or slide the special tab to the left. Later, if you no longer want the cassette to be erase protected, you can seal the gap again with adhesive tape or slide the special tab to the right.

Auto-assembling

You can use the auto-assembling function to join individual recordings without any major picture disturbance between the recordings.

1 During playback, search for the correct position on the tape.

2 Stop playback by pressing the STOP■ button. 'PAUSE' appears on the TV screen.

3 Now start recording as usual by pressing the ●RECORD/OTR button.

Selecting the recording speed (SP/LP)

You can reduce the recording speed by half. This makes it possible to record, for example, 8 hours instead of 4 hours on an 'E240' (4 hour) cassette.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑, and confirm with the → button.

4 Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑, and confirm with the → button.

5 Select the line 'RECORD SPEED' with the menu buttons P↓ or P↑.

6 Select the required recording speed with the menu buttons ← or →.

▷ '**LP**': Long Play = half recording speed (double recording time).
'**SP**': Standard Play = normal recording speed.

▷ The picture quality will be adversely affected when recording at half recording speed ('LP').

▷ For playback, the correct recording speed will automatically be selected.

7 Confirm with the OK button.

8 To end, press the MENU button.

Automatic recording from a satellite receiver (SAT RECORDING)

You can only use this function, when you have a satellite receiver, which can control other equipment by a 'programming' function.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑, and confirm with the → button.

4 Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑, and confirm with the → button.

5 Select the line 'SAT RECORD' with the menu buttons P↓ or P↑.

6 Select the required scart socket 'E1' or 'E2' with the menu buttons ← or →.
If you want to switch off the function, select 'OFF' with the menu buttons → or ←.

7 Confirm with the OK button.

8 Use a scart cable to connect the scart socket you selected on the video recorder (AV1 EXT1 or AV2 EXT2) to the corresponding scart socket on the satellite receiver.

9 Insert a cassette.

10 To end, press the ⏻STANDBY button. The video recorder is now prepared for recording. The start and end of the recording is controlled via one of the scart sockets.

▷ When this function is switched on, '📡' appears in the display.

Direct Record

With this function switched on, and the video recorder **switched to standby**, the video recorder automatically takes the channel number which is currently selected on the television when it starts recording, by means of the scart cable.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View', the video recorder also takes the programme number from the TV set automatically with the video recorder switched on.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑, and confirm with the → button.

4 Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑, and confirm with the → button.

5 Select the line 'DIRECT RECORD' with the menu buttons P↓ or P↑.

6 Select the function 'ON' with the menu buttons ← or →. If you select 'OFF', the function will be switched off.

7 Confirm with the OK button.

8 To end, press the MENU button.

9 Switch off with the ⏻STANDBY button.

10 On the TV set, select the programme number you want make the recording from.

11 Press the ●RECORD/OTR button with the video recorder **switched off**.

▷ Don't select another programme number on your TV set, until the 'search symbol' in the display of your video recorder disappears. This can take up to one minute.

▷ When 'NOTV' appears in the display, the programme number could not be found. The video recorder switches off automatically.

4. AUTOMATIC (PROGRAMMED) RECORDING

The video recorder needs the following information for every programmed recording:

* the date on which the recording is to be made
* the programme number for the TV channel
* the start and stop time of the recording
* VPS/PDC on or off
* the recording speed (SP/LP)

The video recorder stores all the information mentioned above in a TIMER block. You can programme up to 6 TIMER blocks, one month in advance.

'VPS' (Video Programming System) / 'PDC' (Programme Delivery Control)

With 'VPS/PDC', the TV station controls the beginning and the length of the programmed recording. This means that the video recorder switches itself on and off at the **right time** even if a TV programme you have programmed begins earlier or finishes later than expected.
Usually the start time is the **same** as the VPS/PDC time. If, however, in the TV guide, in addition to a TV programme's start time, a different VPS/PDC time is given, e.g.: '20.15 (VPS 20.14)', you must enter '20.14' as the start time **exactly to the minute.** If you want to enter a time that differs from the VPS/PDC time, you must switch off 'VPS/PDC'.

Programming with 'SHOWVIEW'

All the information required for a programming is contained encoded in the SHOWVIEW code.

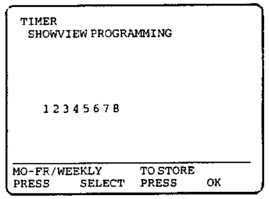
SHOWVIEW

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the TIMER ⊙ button on the remote control. The programming mode selected last is marked.

3 Select the line 'SHOWVIEW' with the menu buttons P↓ or P↑ and confirm with the → button.

4 Enter the entire SHOWVIEW-code (up to 9 digits) printed in your TV guide next to the start time of a TV programme. If you made a mistake, clear the entry with the CLEAR (CL) button.



```
TIMER
 SHOWVIEW PROGRAMMING


    12345678


MO-FR/WEEKLY        TO STORE
PRESS     SELECT    PRESS     OK
```

5 Select programming at daily or weekly intervals with the SELECT button.
'MO-FR': recording at daily intervals from Mondays to Fridays inclusive.
'WEEKLY': recording at weekly intervals on the same day of the week.

6 Confirm with the OK button. The TIMER data will now appear on the TV screen.

▷ If SHOWVIEW does not recognize the TV channel, 'PLEASE ENTER PROGRAMME NUMBER' appears on the TV screen. Select the required programme number (programme name) with the P↑ or the P↓ button. Confirm with the OK button.

▷ If 'SHOWVIEW CODE WRONG' appears on the TV screen, you entered an incorrect code number or the incorrect date. Repeat the entry or end with the TIMER ⊙ button.

▷ If 'WEEKEND PROGRAMMING - NOT POSSIBLE' appears on the TV screen, the date was incorrectly entered. 'Daily' programming can only be used for recordings to be made from Mondays to Fridays inclusive.

▷ Use the SELECT button to switch 'VPS/PDC' on or off in 'START'.

▷ Use the SELECT button to select the recording speed 'SP' or 'LP' in 'END'.

7 Confirm with the OK button.

▷ The data has been stored in a TIMER block.

8 To end, press the TIMER ⊙ button.

9 *Please note that you inserted a cassette without erase protection.* Switch off with the ⏻STANDBY button.
The programmed recording will only function when the video recorder is **switched off** with the ⏻STANDBY button.

▷ If one or more of the TIMER blocks are occupied, '⏻' lights up in the display.

▷ If the end of the cassette is reached during a recording, the cassette will automatically be ejected.

▷ If you forget to load a cassette, 'NO CASSETTE' appears on the TV screen and '⏻' lights up in the display.

▷ If you inserted a cassette with erase protection when you want to start a recording, the cassette will be ejected.

▷ Programme numbers 'E1' and 'E2' are provided for external recordings (via scart socket AV1 EXT1 or AV2 EXT2).

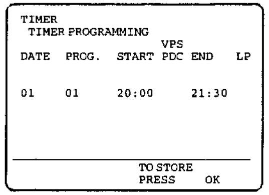
▷ Programme number 'AUX' and 'MIC' are provided for audio recordings (via sockets AUX IN L R) and the microphone socket 'MIC.'.

Manual recording without 'SHOWVIEW'

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the TIMER⏲ button on the remote control.
The programming mode selected last is marked.

3 Select the line 'TIMER PROGRAMMING' with the menu buttons P↓ or P↑ and confirm with the → button.



```
TIMER
 TIMER PROGRAMMING
                        VPS
DATE  PROG.  START PDC END    LP

01    01     20:00     21:30

                 TO STORE
                 PRESS     OK
```

4 Select the entry field with the menu buttons ← or →.

5 Enter data with the menu buttons P↓ or P↑ or with the digit buttons 0-9.

▷ Select recording at daily or weekly intervals in the field 'DATE', with the SELECT button.
'MO-FR': Recording to be made from Mondays to Fridays inclusive.
'MO': Weekly recordings on the same weekday.

▷ Use the SELECT button to switch 'VPS/PDC' on or off in 'START'.

▷ Use the SELECT button to select the recording speed 'SP' or 'LP' in 'END'.

6 Confirm with the OK button.

▷ The data has been stored in a TIMER block.

7 To end, press the TIMER⏲ button.

8 Please note that you inserted a cassette without erase protection. Switch off with the ⏻STANDBY button.
The programmed recording will only function when the video recorder is **switched off** with the ⏻STANDBY button.

▷ If one or more of the TIMER blocks are occupied, '⏻' lights up in the display.

▷ If the end of the cassette is reached during a recording, the video recorder automatically ejects the cassette. The set switches off after a few minutes.

▷ If you forget to load a cassette, 'NO CASSETTE' appears on the TV screen and '⏻' lights up in the display.

▷ If you inserted a cassette with erase protection, the cassette will be ejected.

▷ Programme numbers 'E1' and 'E2' are provided for external recordings (via scart socket AV1 EXT1 or AV2 EXT2).

▷ Programme number 'AUX' and 'MIC' are provided for audio recordings (via sockets AUX IN L R) and the microphone socket 'MIC.'.

How to check or alter a TIMER

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the TIMER⏲ button on the remote control.
The programming mode selected last is marked.

3 Select the line 'TIMER LIST' with the menu buttons P↓ or P↑ and confirm with the → button.

4 Select the TIMER you want to check or alter with the menu buttons P↓ or P↑.

5 Press the menu button →.

6 Select what you want to check or alter data with the menu buttons ← or →.

7 Alter data with the menu buttons P↓ or P↑ or with the digit buttons 0-9.

8 Confirm with the OK button.

9 To end, press the TIMER⏲ button.

10 Please note that you inserted a cassette without erase protection. Switch off with the ⏻STANDBY button.
The programmed recording will only function when the video recorder is **switched off** with the ⏻STANDBY button.

How to clear a TIMER

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the TIMER⏲ button on the remote control.
The programming mode selected last is marked.

3 Select the line 'TIMER LIST' with the menu buttons P↓ or P↑ and confirm with the → button.

4 Select the TIMER you want to clear with the menu buttons P↓ or P↑.

5 Press the CLEAR (CL) button.

6 Confirm with the OK button.

7 Switch off with the TIMER⏲ button.

'NexTView Link'

This video recorder is equipped with the function 'NexTView Link'. If your television is also equiped with this function, you can mark TV programmes on the television for programming. These TV programmes will automatically be transmitted to a TIMER block on the video recorder. If you clear the marking of the TV programme on the television, the corresponding TIMER block on the video recorder will also be cleared.
For more information, read the instruction manual of your TV set.

5. ADDITIONAL FUNCTIONS

Changing the TV system

If you play back recordings made on another video recorder, the automatic TV system switch-over may lead to colour interferences.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. In the line 'TV SYSTEM' select the required TV system with the menu buttons [←] or [→].
5. Confirm with the [OK] button.
6. To end, press the [MENU] button.

ⓘ If colour interference still occurs, you can switch to 'B/W' (black and white) in line 'TV SYSTEM'.

Child lock

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. In the line 'CHILD LOCK' select 'ON' with the menu buttons [←] or [→].
5. Confirm with the [OK] button.
6. To end, press the [MENU] button.
   'σ-' appears in the video recorder display.
   Keep the remote control in a safe place.
7. If you want to switch off the child lock, select 'OFF' in line 'CHILD LOCK'. 'σ-' disappears from the video recorder display.

ⓘ *If a button is pressed with activated child lock, 'σ-'* flashes in the display for a few seconds.

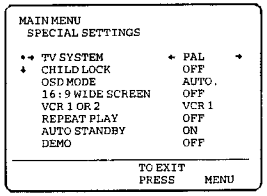
ⓘ Programmed recordings are made despite the child lock and cannot be interrupted.

You may also activate the child lock with the remote control. Press the [⏻STANDBY] button on the remote control for a few seconds, until 'σ-' appears in the video recorder display. Switch the child lock off in the same way.

On Screen Display (OSD)

You can switch the On Screen Display (OSD) on or off.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.



```
MAIN MENU
 SPECIAL SETTINGS

•→ TV SYSTEM              ← PAL      →
↓  CHILD LOCK               OFF
   OSD MODE                 AUTO.
   16 : 9 WIDE SCREEN       OFF
   VCR 1 OR 2               VCR 1
   REPEAT PLAY              OFF
   AUTO STANDBY             ON
   DEMO                     OFF
----------------------------------------
                     TO EXIT
                     PRESS      MENU
```

4. Select the line 'OSD MODE' with the menu buttons [P↓] or [P↑].
5. Select one of the options indicated with the menu buttons [→] or [←].
   'AUTO.': OSD appears for a few seconds each time an operating mode is selected and then disappears.
   'OFF': OSD is switched off.
   'ON': OSD is switched on.
6. Confirm with the [OK] button.
7. To end, press the [MENU] button.

ⓘ With the [OK] button you can superimpose the current operating mode on the TV screen.

How to switch to 16:9

You can only use this function, when the video recorder (socket [AV1 EXT1]) and the TV set are connected with a scart cable.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. If you have a TV set in wide-screen format, select 'ON' in line '16:9 WIDE SCREEN'. If not, select 'OFF' with the menu buttons [→] or [←].
5. Confirm with the [OK] button.
6. To end, press the [MENU] button.

Switching the remote control command

If you have two video recorders with the same remote control command, you can change the remote control command of the handset and the remote control command of one of the video recorders.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].
4. Select the line 'VCR 1 OR 2' with the menu buttons [P↓] or [P↑].
5. Select 'VCR 1' or 'VCR 2' with the menu buttons [←] or [→]
6. Confirm with the [OK] button.
7. On the remote control, press the [SELECT] button and the digit button [2] **at the same time** to switch the remote control to 'VCR 2'.

ⓘ If you want to switch back to 'VCR 1, press the [SELECT] button and the digit button [1] **at the same time**.

8. Confirm with the [OK] button.

ⓘ If the menu does not disappear, the video recorder didn't recognize the remote control command. Repeat step [7]

ⓘ After you changed the batteries of the remote control, it will switch back to 'VCR 1'.

ⓘ If you entered the wrong remote control command, the message e.g.: 'VCR ONLY RESPONDS TO VCR 1 COMMANDS' appears on the TV screen or 'VCR 1' appears in the video recorder display, when you press a button for a few seconds.

Continuous playback

1. Press the [MENU] button. The main menu appears.
2. Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑]. Confirm with the menu buton [→].
3. Select the line 'REPEAT PLAY' with the menu buttons [P↓] or [P↑].
4. Select 'ON' with the menu buttons [←] or [→]. If you select 'OFF', the function will be switched off.
5. Confirm with the [OK] button.
6. Press the [MENU] button.
7. Insert a cassette and start the continuous playback with the [PLAY ▶] playback button.
   When the end of the tape or the end of the recording has been reached, it rewinds and starts playback again.

The automatic switch-off

If the video recorder is not used for a few minutes in certain modes (e.g.: STOP), it switches to standby automatically. You can switch off this automatic switch-off in order to use the video recorder as a television receiver.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the MENU button. The main menu appears.
3. Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑ and confirm with the menu button →.
4. Select the line 'AUTO STANDBY' with the menu buttons P↓ or P↑.
5. Select 'ON' with the menu buttons ← or →. If you select 'OFF', the function will be switched off.
6. Confirm with the OK button.
7. To end, press the MENU button.

▷ A **TIMER recording** only functions when the video recorder is **switched to standby**.

The 'DEMO' function

When the 'DEMO' function is switched on and the video recorder **switched off**, several menus will be demonstrated on the TV screen. This has no influence on operating the video recorder.

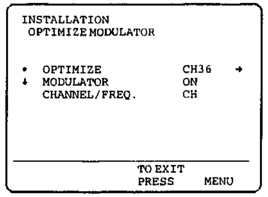
1. Switch on the TV set. If required, select the programme number for the vieo recorder.
2. Press the MENU button. The main menu appears.
3. Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑ and confirm with the → button.
4. In the line 'DEMO', select 'ON' with the menu buttons → or ←.
   If you select 'OFF' the function will be switched off.
5. Confirm with the OK button.
6. To end, press the MENU button.

▷ The 'DEMO' function is not possible during a 'TIMER recording' and during an 'Automatic recording from a satellite receiver'.

Eliminating Picture Disturbance - Optimize the modulator

With 'Connecting without scart cable', UHF-channel CH36or 591MHz might already be being used by another TV station in your reception area. In this case the picture quality on your TV set will be adversely affected when receiving one or more TV channels.

1. Ensure that **no** cassette has been loaded. On the video recorder, **simultaneously** hold the STOP/EJECT ■/▲ and the PLAY ► button for a few seconds until e.g.: UHF-channel 'CH36' or 'M591' appears in the display. The video recorder transmits a test picture on this UHF-channel (or this frequency).



```
INSTALLATION
 OPTIMIZE MODULATOR

•  OPTIMIZE           CH36   →
↓  MODULATOR          ON
   CHANNEL/FREQ.      CH

              TO EXIT
              PRESS       MENU
```

2. In line 'CHANNEL/FREQ.' select the indication for channel 'CH' or frequency 'FREQ.', using the menu buttons → or ←.
3. Select the line 'OPTIMIZE' with the menu buttons P↑ or P↓. Press the menu button →.
4. When the video recorder finds a 'free' TV channel, the channel or frequency will be indicated.

▷ You can also enter the channel or frequency directly with the digit buttons 0-9.

5. Tune in the TV set in this channel or frequency.
6. Confirm the channel or frequency indicated with the OK button.
7. To end, press the MENU button.

Switching off the modulator

If you cannot eliminate picture or sound interference, you can switch off the built-in modulator. You should only do this if you have connected the video recorder to the TV set with a scart cable. 'Connecting VCR without scart cable' is not possible when the modulator is switched off.

▷ With the function 'Easy Link/NexTView' the modulator will be switched off automatically.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Please note that **no** cassette has been inserted. Press the STOP/EJECT ■/▲ and the PLAY ► button **simultaneously** for several seconds until e.g.: 'CH36' appears in the display.
3. Select the line 'MODULATOR' on the TV screen or 'M ON' in the display with the menu buttons P↑ or P↓.
4. With the menu buttons ← or →, select the function 'OFF' on the TV screen or 'MOFF' (modulator off) in the display. Select 'ON' on the TV screen or 'M ON' (modulator on) in the display to switch the modulator back on.
5. Confirm with the OK button.
6. To end, press the MENU button.

Remote control of TV sets

This remote control can operate with a number of remote control commands for TV sets of different makes.
Using the **TV** button set, you can activate the following functions:

◢+/−	TV volume plus, minus
TV🔇	Switch off sound
TV⏻	Switch off TV set
P+/−	TV programme number plus, minus

1. Direct the remote control at the TV set.
2. Press the TV⏻ and the digit button **at the same time**.

Digit button	TV make
0	Philips, Radiola (F), Schneider (F)
1	Grundig
2	Panasonic
3	Panasonic
4	Sony

▷ If the selected code does not operate with your TV set, or if the TV make is not contained in the list, you can try out the codes one after the other.

Audio only record

You can use your video recorder as a HiFi tape recorder. You can record the sound from e.g. a HiFi unit or a second video recorder.

1. Use an audio cable to connect your HiFi (stereo) unit to the AUX IN L R socket at the back of the video recorder.
2. Select the programme number from which the 'only audio' recording should be made, using the P↑ or P↓ button (e.g.: 'AUX' for the AUX IN L R socket.
3. Press the MENU button. The main menu appears.
4. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the → button.
5. Select the line 'AUDIO ONLY' with the menu buttons P↓ or P↑ and confirm with the → button.
6. To start sound recording, press the ●RECORD/OTR button.
7. To stop recording, press the STOP■ button.
8. To end, press the MENU button.

Manual audio control

With the MANUAL button you can switch to manual audio control.

1. Press the MANUAL button on the video recorder. The current selection appears in the display.

2. Keep pressing the MANUAL button until 'MAN' (manual audio control) appears in the display.

3. With the P↑ and P↓ buttons, adjust the recording level so that the '0dB' mark lights up during the loudest parts of the recording.

▷ With TIMER recordings and 'automatic recording from a satellite receiver' the sound is always controlled **automatically**.

▷ At step 2 you can switch back to 'AUTO.' (automatic audio control) with the menu button →.

Audio dubbing

This function enables you to replace (dub) the sound track of an existing recording with another sound track. To do this, connect an audio source (e.g.: a CD-player) to the L-AUDIO-R (programme number 'E3') socket. You can also connect a microphone to the socket MIC. (programme number 'MIC').

1. Switch on the TV set. If required, select the programme number for the video recorder.

2. Press the MENU button. The main menu appears.

3. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the → button.

4. Select the line 'AUDIO DUBBING' with the menu buttons P↓ or P↑ and confirm with the → button.

5. Select the programme number for the audio source (e.g.: 'E3'). Switch on the external audio source.

6. During playback, locate the position on the tape at which the audio dubbing is to end.

7. Press the STILL/JOG ON ▶◀ button. 'STILL' appears on the TV screen.

8. Press the CLEAR (CL) button. '0:00:00' appears on the TV screen.

9. Locate the position at which the audio dubbing is to start.

10. Press the STILL/JOG ON ▶◀ button. 'STILL' appears on the TV screen.

11. Press the STOP ■ button.

12. Press the ●RECORD/OTR button. The video recorder will start to record the sound transmitted from the audio source. The normal (linear) sound track is re-recorded, the stereo sound will remain.
    The audio recording stops **automatically** when the counter reaches '0:00:00'.

13. To end audio dubbing,press the MENU button.

▷ To play back the audio dubbing, read the section 'Sound track selection' in chapter 5, 'ADDITIONAL FUNCTIONS'.

Headphones volume

1. During playback, press the MENU button. The main menu appears.

2. Select the line 'PLAY FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the menu button →.

3. Select the line 'HEADPHONE VOLUME' with the menu buttons P↓ or P↑ and confirm with the menu button →.

4. Adjust the volume with the menu buttons ← or →.

5. Confirm with the OK buton.

6. To end, press the MENU button.

Selecting the sound track

You can select the required sound track. This is of particular interest when the audio transmissions are multilingual.

1. Press the SELECT button. The current setting will appear on the TV screen.

2. By pressing the SELECT button several times you can select from the four possibilities displayed ('STEREO', 'RIGHT', 'LEFT', 'MONO').

▷ During playback you can select a fifth possibility: the 'MIXED' mode. In this mode you can playback the mono sound of the normal (linear) audio track together with the sound of the stereo audio track.

▷ If there is no stereo sound recorded on the cassette, the video recorder automatically switches to mono sound.

Synchronous editing (synchro-edit)

You can synchronously copy between this video recorder and an appropriately equiped camera recorder. Both units are started at the same time with the help of a synchronous impulse and an adjustable start delay (=preroll time).

Adjusting the video recorder to the camera recorder.

1. Connect the two units with a synchro-edit cable (socket SYNCHRO EDIT on the left front of the video recorder).
    Connect the video/audio source to the input sockets L-AUDIO-R and VIDEO (programme number 'E3') of the video recorder.
    Please also observe the instruction manual of the camera recorder.

2. Switch on the TV set. If required, select the programme number for the video recorder.

3. Press the MENU button. The main menu appears.

4. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the menu button →.

5. Select the line 'CAMERA LINK' with the menu buttons P↓ or P↑.

6. Switch the **camera recorder** to **'still picture'** (playback-pause).

7. Confirm with the menu button →. The video recorder now controls the connected camera recorder type.

8. The following message appears on the TV screen: 'VCR CONTROL DETECTED' when the video recorder controls the camera recorder or 'CAMERA CONTROL DETECTED' when the camera recorder controls the video recorder.

Starting synchro-edit

1. Switch on the TV set. If required, select the programme number for the video recorder.

2. Press the MENU button. The main menu appears.

3. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the → button.

4. Select the line 'SYNCHRO EDIT' with the menu buttons P↓ or P↑ and confirm with the → button.

5. The OSD corresponding to the connected camera recorder type appears on the TV screen.

6. Search the beginning of the recording on the video recorder.

7. Press the STILL/JOG ON ▶◀ button. 'STILL' appears on the TV screen.

8. Use the SELECT button to select the OSD for the camera recorder.

9. Search the beginning of the recording on the camera recorder.
    Switch the camera recorder to 'still picture' (playback-Pause).

The way copying is started depends on the camera recorder type used:
Variant 1 when the video recorder controls the camera recorder, or
Variant 2 when the camera recorder controls the video recorder.

Variant 1, the video recorder is to control the camera recorder

1 Start copying with the ●RECORD/OTR button on the video recorder.
The camera recorder starts 'PLAYBACK' and at the same time the video recorder starts 'RECORDING'.

2 Stop copying with the STOP■ button on the video recorder.

3 End copying with the MENU button.

Variant 2, the camera recorder is to control the video recorder

1 Start copying with the corresponding button on the camera recorder.
The camera recorder starts 'PLAYBACK' and at the same time the video recorder starts 'RECORDING'.

2 Stop copying with the PAUSE or STILL button on the camera recorder.

3 End copying with the MENU button.

Setting the 'preroll time'

When the beginning of the recording is missing, the 'preroll time' was too long. Select a shorter 'preroll time'.
If recording started too early, the 'preroll time' was too short. Select a longer 'preroll time'. You can select a 'preroll time' between 1:00 and 5:00 seconds.

1 Press the MENU button.

2 Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the menu button →.

3 Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑ and confirm with the menu button →.

4 In line 'PREROLL TIME', adjust the 'preroll time' with the menu buttons → or ←.

▷ You can also directly enter the 'preroll time' with the digit buttons 0-9.

▷ With the CLEAR (CL) button you can reset the 'preroll time' to that of the identified camera recorder type.

5 Confirm with the OK buton.

6 To end, press the MENU button.

Before you call an engineer

If, contrary to expectation, you experience any difficulty in operating this video recorder, it may be caused by one of the reasons mentioned below. You can also call the **customer service** in your country.
You will find the telephone numbers in the enclosed guarantee leaflet.

The set does not respond to any button being pressed:
No power supply.
A programmed recording is currently being made.
Child lock is active.
Technical disturbance: disconnect from the mains for 30 seconds, then re-connect. If this does not have any effect, you can:
1. Disconnect from mains.
2. Re-connect to mains **whilst holding down** the STANDBY⏻ button on the video recorder until the message disappears from the display. All stored data will be reset (cleared).

Cassette jammed:
Don't use force. Pull out the mains plug for a moment.

Remote control does not operate:
Remote control not pointed toward the video recorder.
Batteries are exhausted. Change batteries.
Remote control command wrong. Read the paragraph 'Switching remote control command' in chapter 'ADDITIONAL FUNCTIONS'.

No playback from video recorder:
No recording on the cassette: Change cassette.
The VCR programme number on the TV set was incorrectly selected or incorrectly set: On the TV set, select the correct programme number.
The connecting cable between the TV set and the video recorder has come loose: Check cable.

Poor playback from video recorder:
TV set not properly adjusted.
Cassette badly worn or of poor quality: Use new cassette.
Tracking not properly adjusted, video heads dirty: Read the section about 'Selecting the picture setting (SMART PICTURE), as well as 'Eliminating picture disturbance' in chapter 'PLAYBACK'.

No recording possible:
TV channel not stored or wrongly selected: Check TV programmes stored.
Cassette with erase protection has been loaded: Undo erase protection.

Programmed recording does not function:
TIMER not set properly: Check TIMER blocks.
Time/date wrongly programmed: Check time/date.
A cassette with erase protection has been loaded: Undo erase protection.
'PDC' or 'VPS' switched on but 'PDC/VPS time' wrong: Enter PDC/VPS time exactly to the minute. Check aerial.

Picture or sound interference on TV reception:
Turn to Chapter 5 'EXTRA FUNCTIONS' and read in the section 'Eliminating picture interference - Optimize the modulator' and 'Switch off the modulator'.
Have your aerial checked.

Enter the serial number of your appliance here:

MODEL NO./TYPE **VR850/02**

PROD.NO.:/SER.NR.......

This product complies with the requirements of the Directive 73/23/EEC + 89/336/EEC + 93/68/EEC.

Instructions for removal

General guidelines for removing parts of the housing, the electronics and the drive

When dismantling or assembling equipment, always ensure that the mains plug has been removed.

Due to the main voltages (hot circuit) on the primary side of the switched-mode power supply, an isolating transformer is absolutely essential for operating the device.

The drive or the combination drive –
The motherboard must not be lifted out using the transverse struts on the lift!
Components underneath the drive must be installed straight!

Troubleshooting for the power supply unit may only be carried out using a variable isolating transformer.

All screws in the video recorder can be unfastened or tightened using a 10 *) Torx screwdriver.

1. Housing cover (Fig. 1)

- Unscrew and remove the five screws (S1).
- Lift the housing cover out of the groove and slide backwards by about 4 cm.
- Push outwards the underside of the side walls in the middle by approx. 1 cm, and lift the cover upwards.

Assembly:
Installation is carried out in the reverse order.

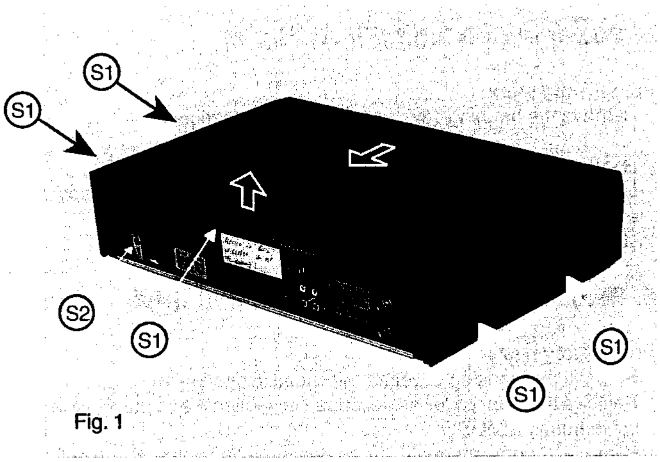


Fig. 1

2. Floor plate (Fig. 2)

Preparatory work:
Remove the housing cover as described in section 1.

- Remove the S2 screws (Fig.1).
- Turn the unit over (bottom facing upwards).
- After unlocking the three H1 snap-on hooks from left to right, the floor plate can be pushed backwards by approx.1cm and lifted off.

This means that the most important ICs and the µP on the underside of the motherboard (MOBO) are accessible.

Installation:
Installation is carried out in the reverse sequence.

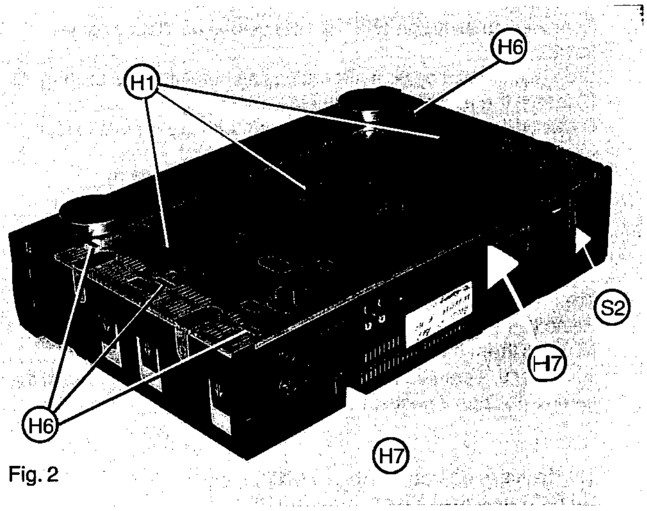


Fig. 2

3. Front panel (Fig. 3)

Preparatory work
Remove the housing cover as described in section 1.

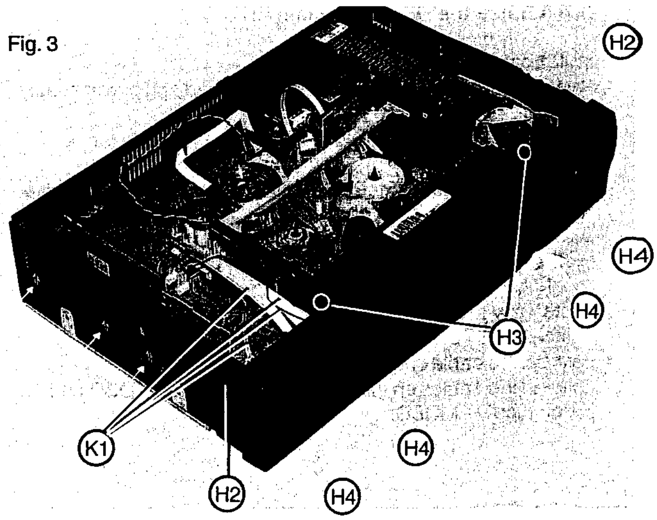
- Remove the four K1 cables from the MOBO.
- Push the two H2 snap-on hooks outwards and then push the top panel side forwards by about 2mm.
- Then unfasten the two H3 snap-on hooks on the top side.
- Finally, unfasten the four H4 snap-on hooks and pull off the front panel towards the front.

The set remains fully operable throughout this procedure.

Installation:
- Attach the front panel until the snap-on hooks engage.
- When doing this, make sure that the lift flap lever slides into the guide for the lift flap.
- Re-attach the four K1 cables on the MOBO.

Important!
- Check that all the snap-on hooks are fully engaged and that all the cables have been inserted!

Fig. 3



---

*) ... available from specialist outlets

4. Control printed board - ADCP / ACP

Preparatory work

Remove the housing cover as described in section 1.
Remove the front panel as described in section 3.

- Unfasten the eight S3 screws and lift off both boards.
- The shuttle knob can simply be taken off.

5. Power supply unit (Fig.1; Fig. 4)

Preparatory work

Remove the housing cover as described in section 1.

- Remove the S2 screws on the power supply unit (Fig.1).
- Unfasten the H5 snap-on hooks (Fig. 4) and lift the power supply unit out of the groove.

Installation is carried out in the reverse sequence.

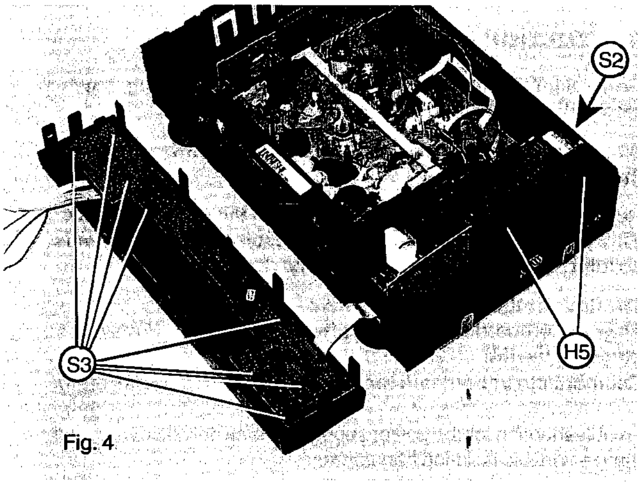


Fig. 4

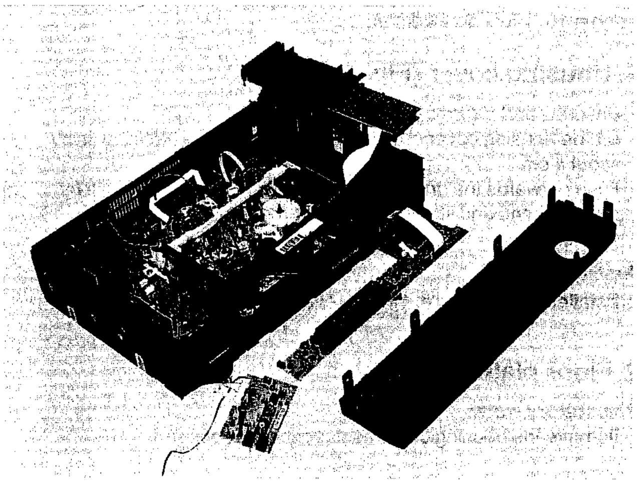
6. Removing the MOBO combination drive

Preparatory work

Remove the housing cover as described in section 1.
Remove the front panel as described in section 3 and pull out the cable from the MOBO.
Remove the power supply unit as described in section 5 and pull out the cable from the MOBO.

- Remove the three fixing screws (F) in the MOBO (Fig. 5), although these screws are not absolutely necessary thanks to the design.
- Remove cables K2 and K3 from the guides on the rear of the frame.
- Slide back the lift by 5cm after releasing both lift locks LS (Fig. 5).
- Unfasten the four screws S4 on the driver (Fig. 5)
- Break off the four plastic parts sprayed onto the groove to lock the snap-on hook (Fig.3).
- Turn the unit over (bottom side facing upwards) (Fig.2).
- Fix the four H6 snap-on hooks in the open position using the plastic parts (Fig. 2).
- Unfasten the remaining two H7 snap-on hooks and lift up the frame (Fig. 2).
- The frame can now be lifted off carefully.
- Remove the four plastic parts from the groove again and DO NOT put them back into the unit.
- Turn over the combination MOBO drive carefully, and place in the service position if necessary (Fig. 6).

The device is operable in this position.
DO NOT use the „Eject“ function !!!



Caution:

No play back adjustments may be made in the service position.
DO NOT use the „Eject“ function !!!

Installation:

- Remove the cable to the control printed board and power supply unit from the MOBO.
- Place the frame on a level surface with the open side facing upwards.
- Grip the drive **at the sides** by the lift and place the MOBO drive unit into the frame.
- Make sure that the cinch socket and the scart socket are inserted into the guides.
- Check that all the snap-on hooks on the MOBO are engaged!
- Tighten any screws (F) (Fig. 5).
- Tighten the S4 screws on the drive again (Fig. 5).
- Connect the cable once more.
- Connect the cables on the control printed board - MOBO and the power supply - MOBO.

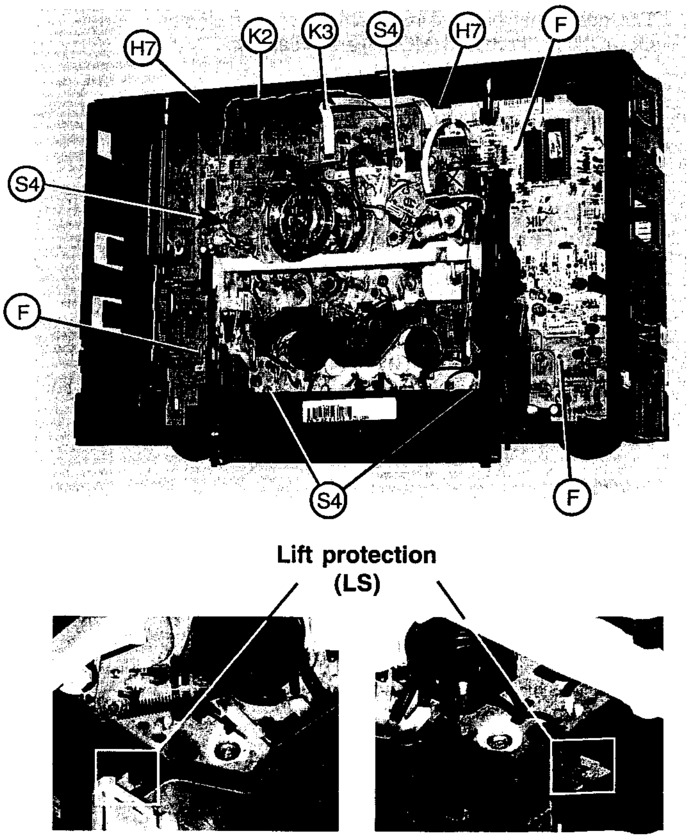


Fig. 5

7. Removing the drive (Fig. 5)(Fig. 6)(Fig. 8)

Preparatory work

Remove the housing cover as described in section 1.
Remove the front panel as described in section 3.

- After releasing both lift locks, slide back the lift by 5 cm.
- Undo and remove the four fixing screws (S4) on the drive.
- Undo and remove the earthing screw (M) on the underside. (To do this, insert the screwdriver through the hole in the rear panel.) (Fig. 8)
- Remove all cables from the drive.
- Bend the screening panel on the scanner cable backwards.
- Remove the scanner cable from the plug.
- Move the lift back to the „Eject" position.
- Lift the drive backwards slightly to unfasten the plug connection to the capstan motor.
- Press together the two snap-on hooks (S) using pointed pliers and lift up the drive near the snap-on hooks (Fig. 7).
- The drive can now be separated from the MOBO.

Installation:
Installation is carried out in the reverse order.

Important

Make sure that the cables (K1; K2;) are positioned in the mounts on the rear of the frame, and that the earthing screw (M) is screwed on!

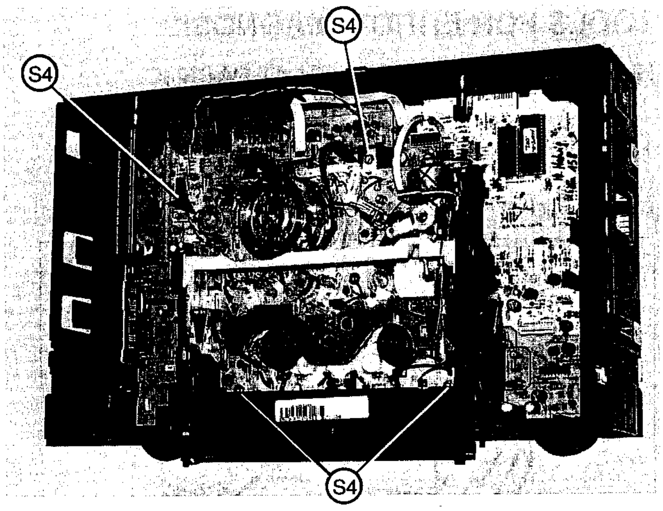
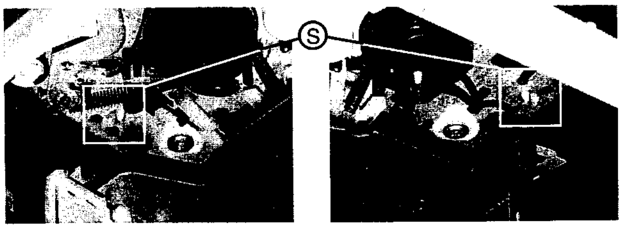


Fig. 7



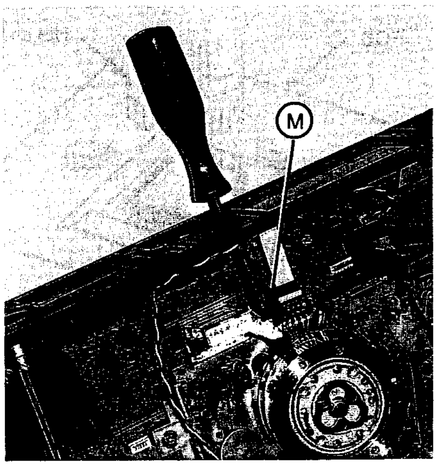


Fig. 8

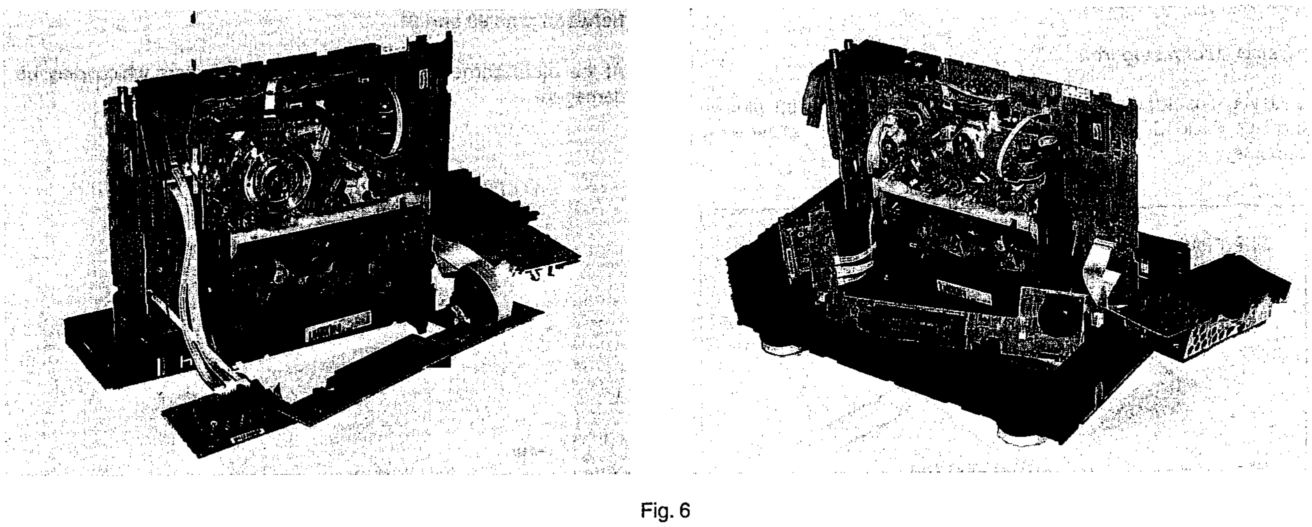


Fig. 6

TOOLS FOR ERROR DIAGNOSIS

How to remove/install the FLAT PACK IC

1. How to remove a Flat Pack IC

Using hot air Flat Pack IC unsoldering equipment

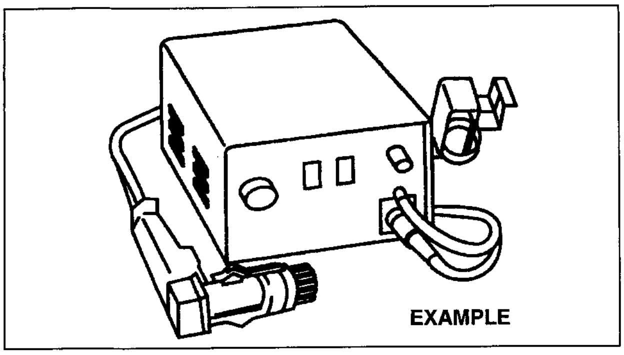


Fig. 2-1

a. Prepare the hot air Flat Pack IC unsoldering equipment. Then apply hot air to Flat Pack IC for 5 - 8 seconds.

b. Remove the Flat Pack IC with tweezers after applying the hot air.

CAUTION: To avoid damage, do not apply the hot air to the chip parts around the Flat Pack IC for long periods.

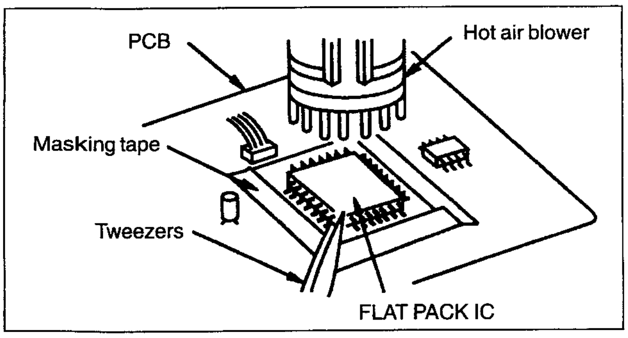

PCB
Hot air blower
Masking tape
Tweezers
FLAT PACK IC

Fig. 2-2

Protect adjacent parts with masking tape.

Flat pack ICs are fixed to the PCB with glue. When removing it, take care not to break or damage any foil under the IC or near the soldering eyelets.

If a knife, thin screwdriver, etc. is required to remove the control/deck µP pos. 7406, it should only be used on the corner between pins 90 and 91.

- ***Using a soldering iron***

a. Use an unsoldering braid to remove the solder from all the pins on the Flat Pack IC. Apply solder flux to all the pins to allow easy removal.

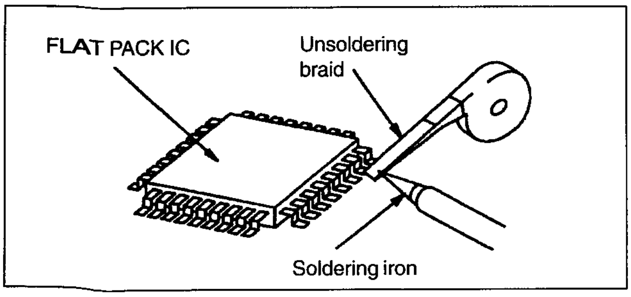

FLAT PACK IC
Unsoldering braid
Soldering iron

Fig. 2-3

b. Lift up each individual pin using a needle or a piece of iron wire whilst heating the pins using a fine tip soldering iron or a hot air blower.

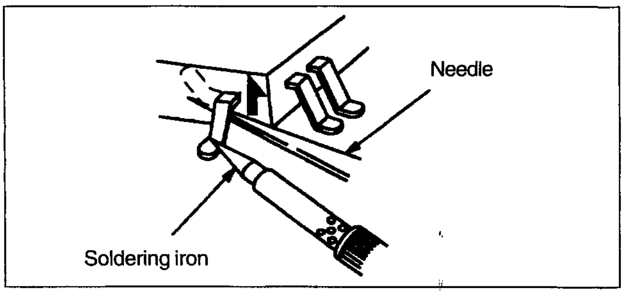

Needle
Soldering iron

Fig. 2-4

- ***Using iron wire***

a. Use an unsoldering braid to remove the solder from all the pins on the IC. Apply solder flux to all the pins to allow easy removal.

b. Affix the wire to the work surface or to a fixed anchorage point (see fig. 2-5).

c. Pull the wire upwards as soon as the solder melts to release the pin on the IC from the PCB contact pad, whilst continuing to heat the pins using a fine tip soldering iron or hot air blower.

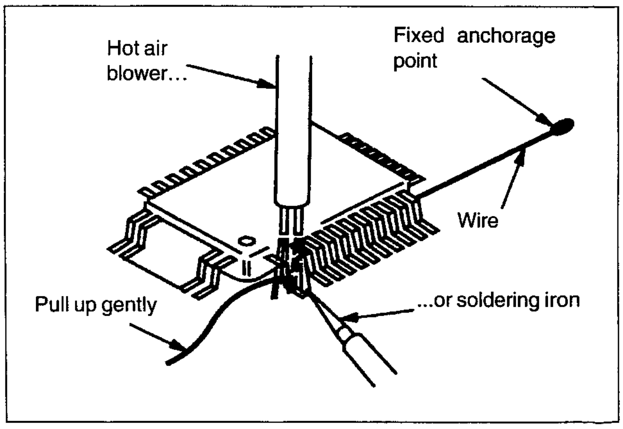

Hot air blower...
Fixed anchorage point
Wire
Pull up gently
...or soldering iron

Fig. 2-5

Note:
If the IC is glued, heat it first using a hot air blower to melt the glue.

CAUTION:
If a knife, thin screwdriver, etc. is required to remove the control/deck µP pos. 7406, it should only be used on the corner between pins 90 and 91.

At the other corners there are printed conductors which may be damaged!

• Using a special solder removal device

a. Apply extra tin-lead solder onto the pins

b. Heat the IC to melt the glue which has been used to affix it

c. Use a solder removing device with a special punch which matches the contours of the IC to remove the IC.

If a knife, thin screwdriver, etc. is required to remove the control/deck µP pos. 7406, it should only be used on the corner between pins 90 and 91.

At the other corners there are printed conductors which may be damaged!

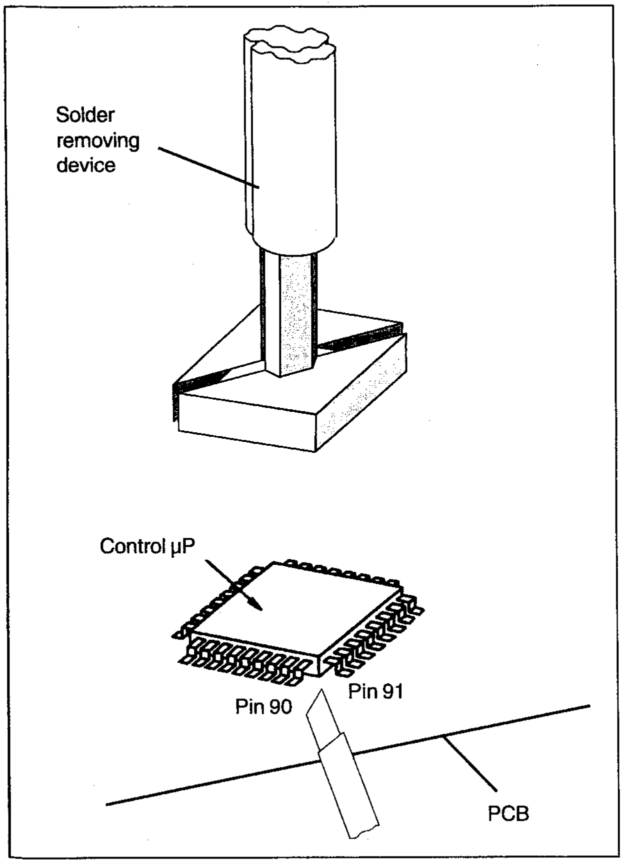
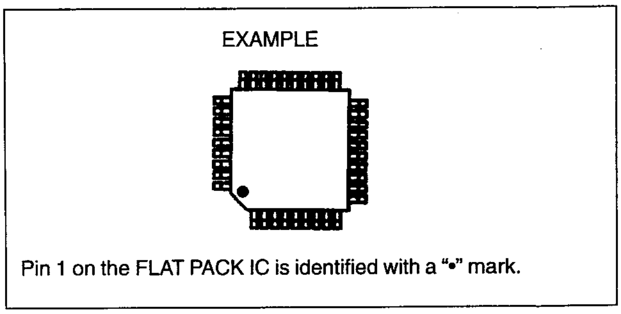

Solder removing device
Control µP
Pin 90
Pin 91
PCB

Fig. 2-6

2. How to install the FLAT PACK IC

a. Use an unsoldering braid to remove the solder on the soldering eyelets on the PCB. This makes it easier to install the new FLAT PACK IC.

b. The "•" mark on the IC indicates pin 1.
Make sure this mark matches contact 1 on the PCB. Solder the four corners of the IC (see fig. 2-7).



Pin 1 on the FLAT PACK IC is identified with a "•" mark.

Fig. 2-7

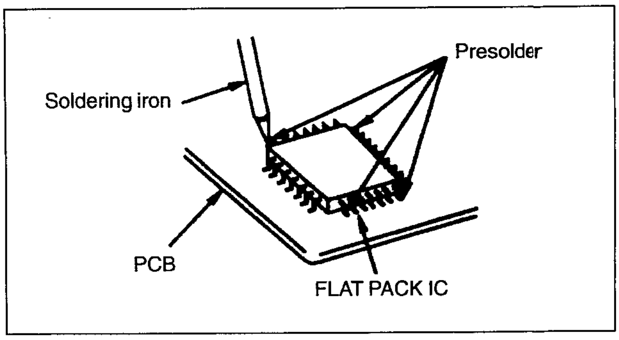

Presolder
Soldering iron
PCB
FLAT PACK IC

Fig. 2-8

c. Apply extra flux onto the pins

d. Solder all the pins on the FLAT PACK IC

e. Remove excess tin-lead solder using an unsoldering braid. Make sure that none of the pins have solder bridges between them.

Note
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described in the "Safety instructions" section of this manual.

Voltage measurements

Colour bar signal in RECORD and PLAY modes at normal speed.

Note:
The voltages for REC. and PLAY are given on the schematic diagrams in the figure below.

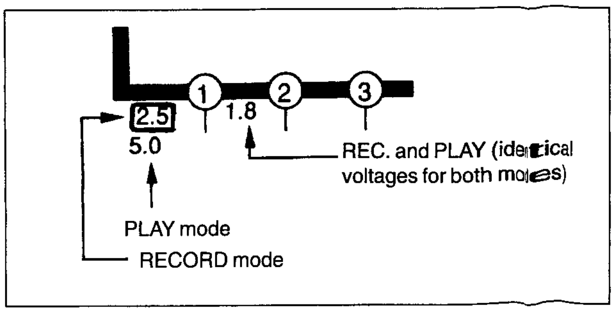

1
2
3
2.5
1.8
5.0
REC. and PLAY (identical voltages for both modes)
PLAY mode
RECORD mode

Fig. 2-10

2. TOOLS FOR ERROR DIAGNOSIS

2.1 Erasing the EEPROM

- Disconnect from the mains
- Press and hold down the Standby key, reconnect to mains and keep the Standby key depressed until the display illumination is switched off (approx. 8 sec.)

All EEPROM data will then be erased and initialised (timer and transmitter channels). The internal processor Ram is also erased, but the option codes, deck parameters, operating hours counter and adjustment values are maintained.

2.2 Changing the EEPROM

After changing the EEPROM the following steps must be carried out:

Step 40: Option code entry
Step 51: Setting the vertical head switching position
Step 52: 'Studio Picture control' adjustment
Step 53: Clock adjustment
Step 60: Level adjustment stereo decoder
Step 61: Channel separation stereo decoder
Step 62: Audio linear playback level
Step 63: Bargraph level

2.3 Service Test Program

2.3.1. Introduction

The software program for the microprocessors includes a service test program. It is divided into the following steps, with the following 'modes':

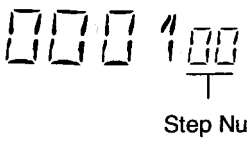
Step	**Name**
00	Mask version
01	Deck position
02	Deck error code
03	Deck sensors and manual tracking
04	Operating hours
05	Device check
10	Operation without tape deck - dummy mode
40	Option setting
51	Vertical head switch. pos. adj.
52	SPC adjustment
53	Clock adjustment
60	Level adj. stereo decoder
61	channel separation
62	Audio linear playback level adjustment
63	Bargraph level
95	EEPROM read/write
98	Display test
99	Clock measurement

The functionality of the set during service mode differs from the normal operation:

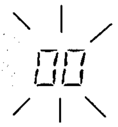
- All deck modes are available.
- Childlock is deactivated after calling up and exiting the service mode.
- There is no Autostandby and Autotracking. Tracking always in middle position except step 3.
- No menu and therefore no tuning.
- No preset change with UP/DOWN possible. The preset number which was set upon entering the service test program is maintained.

2.3.2. Activating and leaving the service test program

Press and hold down the 'STOP' key on the remote control. Then press the 'PLAY' key on the recorder and keep both keys depressed for at least 5 sec.
After calling up the service test programme, Step 00 is automatically displayed with the mode 'mask version number'.



To change a step press key 'SELECT'. After this the display shows flashing the actual step number. All step modes may be selected with UP/ DOWN or digit entry. To enter and to activate the new step number press key 'SELECT'.

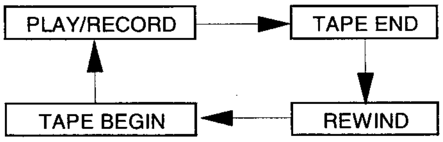


If you have entered an unknown step number the display will show flashing '--'

To leave the service program, press the STANDBY key or disconnect recorder from mains.

2.3.3. Continous test

In the service test program, the recorder can be put to a continous test. For this, use a cassette and activate 'PLAY' or 'REC'. The functions are then repeated continuously. In RECORD, the recorder does not go to EJECT at the tape end, but to REWIND, after which it starts RECORD again. This test serves to detect intermittent faults. The last deck error is stored in the EEPROM. (The fault remains stored even after a power interruption.)
The continous test is ended by pressing 'STOP' or leaving the service test program.

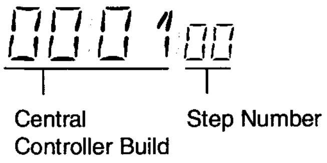

PLAY/RECORD
TAPE END
TAPE BEGIN
REWIND

2.3.4. Description of steps:

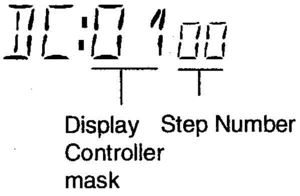
Step 00: Display of mask version numbers

After activating the service test program, Step 00 with the mode mask version number is automatically displayed.

a) After calling up the service test programme, the version ('build') number of the control microprocessor is displayed,

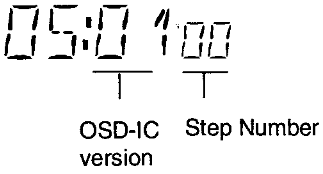

0001 00
Central Controller Build
Step Number

after pressing the 'DOWN' key,
b) the mask number of the Display Controller is displayed

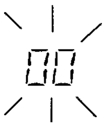

DC:01 00
Display Controller mask
Step Number

Pressing 'UP' goes back to the Central Controller mask number.

After pressing the 'Down' key again
c) the mask version of the On Screen Display IC is shown:


OS:01 00
OSD-IC version
Step Number

This mode can be left again by pressing the 'SELECT' key on the remote control. The currently selected step number appears and flashes on the display.



A step between 00 and 99 can now be selected.

Step 01: Checking the drive positions

By calling up Step 01, the drive position appears on the display.
The drive position which is linked with the count of the FTA pulses of the loading tacho is shown as a 3-digit decimal number.
(e.g. 07 = Eject)

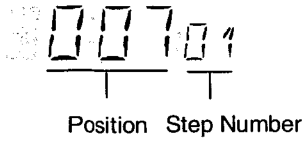
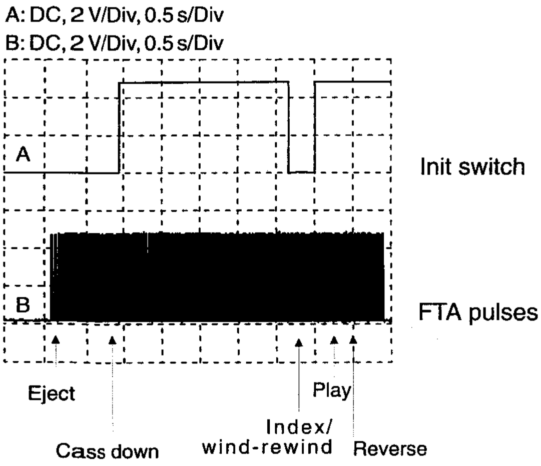


Table of drive positions:

Status	Position	Position
	no Jog/Shuttle	Jog/Shuttle
Eject	7+2-2	7+2-2
Index	191+0-2	191+0-2
Stop out	200+4-4	200+4-4
Play	214+4-4	211+4-4
Reverse	237+2-0	237+2-0

Function of the Init switch:

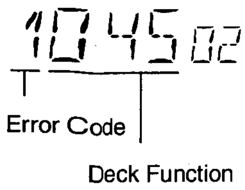
The diagram shows the function of the Init switch, depending on the position of the drive.



Step 02: Display of the deck error code

In this step the last 3 deck error codes are displayed. On entry the display shows the last deck error code.
The deck status in which the error occured is shown with 3 digits.
The error codes remain in the EEPROM, even if the recorder is disconnected from the mains.

With the DOWN key you can select the other 2 errors; with UP you can go back to the last error again.



Remark: When a series of errors occurs, only the first error is displayed; i.e. when the deck μP detects a head motor error and wants to eject the cassette but the eject cannot be performed then the head motor error is displayed and not a threading error.

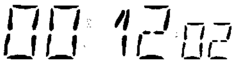
Error table:

0	no error
1	threading error
2	no capstan pulses
3	tape broken
4	no pulses left reel
5	no pulses right reel
6	head motor error

Function table:

12	Standby	115	Viss erase	215	Slow motion 1/7
14	Autotracking	125	Tuner - Stopout	216	" " 1/2
31	Play*-3	126	Auto Remain Function	217	" " -1/24
34	Slow_reverse	130	ATTS Function	218	" " -1/14
41	Still Picture	168	Frame+	219	" " -1/7
42	Fast	169	Frame-	220	" " -1/2
44	Play*-9	170	Play*-11	222	Edit Record
45	Eject	171	Play*-7	223	Auto align of Head sw. Pos
46	Play*9	172	Play*-5	225	Autotracking Abort
47	Play*-1	173	Play*5	238	Pause
48	Pause	174	Play*7	239	SPC align
50	Rewind	175	Play*11	246	Edit Pause
52	Wind	196	Tuner - Eject	247	Slow motion 1/10
53	Play	197	Standby Eject	248	" " 1/18
54	Stop out	199	Audio Dubbing	249	" " -1/10
55	Record	202	Audio Dubbing Pause	250	" " -1/18
112	Index next	206	Reset Tapecounter	253	Key Released
113	Index previous	211	Slowmotion 1/24		
114	VISS write	212	Slow motion 1/14		

To clear all error codes press CLEAR.
After doing this the display shows:



Checking the drive functions:

Time for loading and unloading
The signal of the photoelectric barrier which controls the revolutions of the loading motor is used as a reference for the loading and unloading time.

Stopping of the left or right winding disk
The tacho signals of the left (WTL) and right (WTR) winding disks are used as a control reference.

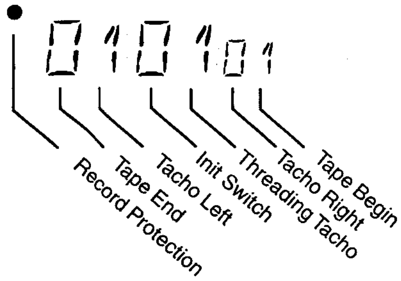
Stopping of the head motor
This is monitored with the PG/FG signal. The signal is derived from the e.m.f. of the non-conducting windings of the head motor, showing the speed and position of the head drum.

Capstan motor fault
This is monitored with the capstan tacho signal.

If one of the above sensor signals is not available, the recorder tries to put the lift to the 'EJECT' position.

Step 03: Deck sensors and manual tracking

The display shows the deck sensors and will be updated periodically.



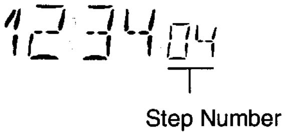
Icon '●' is used to display the status of the record protection (icon lighted means record protection active).
The actual deck status is shown as icon in dot matrix i.e. ▶ ■ ❚❚ ● ▶▶ ◀◀ ◀

Tracking:

In the service test program, the tracking is always set to the centre position. Only in this step the tracking value can be changed with the UP / DOWN keys for necessary tape adjustments (X distance).
After leaving the mode by pressing the SELECT key, the tracking value always resets itself to the centre position and cannot be changed.

Step 04: Display of the operating hours counter:

By activating Step 04, the operating hours counter shows how many hours the head disk has turned. The hours are displayed as a 4-digit decimal number.

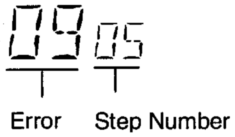


Step 05: Bus communication error

By activating Step 05, the error code of the malfunctioning or missing IIC - component is displayed.

However, if the **EEPROM** does not acknowledge at boot time the machine does not continue to boot but displays the **error code '301-73'** in the display instead. After five seconds the machine trys to reboot. This results in an endless loop if the EEPROM is defective.

An **EEPROM Read/Write Check** is executed upon entry of service step 5.
Due to the programming time of the EEPROM the EEPROM Read/Write check may take several seconds (depending on the size of the EEPROM). If during this time the VCR is interrupted (e.g. by means of a mains reset) part of the EEPROM data may be corrupted.



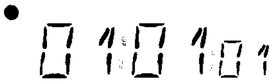
By pressing the DOWN key, all error codes can be selected in succession. If a version does not contain the IIC bus component, this is also shown as an error. (a fault of the Luminance/Chroma/Audio-processor 7005 cannot be displayed)

Error code table:

Code	Description	Pos.
0	no error, all expected devices are available	
1	Tuner	7702
2	Modulator	7702
5	OSD/PDC/VPS	7851
7	Audio Processor: no Acknowledge	7651
8	Videomatrix	7506
9	Nicam	1972/7700
10	Stereo Decoder	7771
11	TXT data slicer (not used)	7871
13	EEPROM read/write error	7401
14	Audio Processor: no HP2 detected	7651

Step 10: Operation without drive - dummy mode

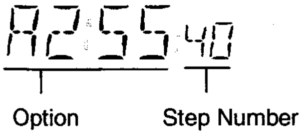
Enter the mode by pressing the SELECT key. All motors are then switched off and the sensors will be ignored by the deck microprocessor. The drive can now be dismantled from the motherboard (see dismantling instruction). **When mounting the drive ensure that the mains is disconnected!** For signal tracking, the recorder can be set to all drive conditions, i.e. signal electronics, audio and IO processing are switched to the corresponding operating mode.



The step has to be left with mains interruption.

Step 40: Option code input

If, as part of repair work, a new EEPROM is installed, it has to be initialised.
After activating Step 40, option A appears in the display.



The available options can be selected with the UP and DOWN keys.

By entering a 3-digit decimal code, the correct options (features) are set. The codes are listed on the type plate of the set.
By using the 'CLEAR' key on the remote control, incorrectly entered values can be cancelled.

After pressing the 'OK' key, the entered codes are saved and 'OK' appears on the display for approx. 5 sec.

Step 98: Display Test

After activating Step 98, all display sections are illuminated with half the brightness.
The step has to be left with mains interruption.

2.4. Customer Service Mode (CSM)

2.4.1 General

Answering customer questions on the phone is a lot easier if the customer could be more specific about his problem. Once the Customer Information Center CIC knows the problem in the most cases the answer is easy. The Customer Service Mode helps customers to be more specific in their questions by providing them with a built in menu driven on-screen diagnostics system. It therefore helps dealers and CIC to provide fast and correct answers via phone.

The system enables:

- Easier handling of non-technical calls.
- More reliable information to the customer that a repair action is necessary.
- Identification of software versions via phone.

The Customer Service Mode is a read only, menu based information system which can be called up by the customer at home.

2.4.2 Calling up the Customer Service Mode

To enter the customer service mode press first STOP on the set and then MENU on the remote control and keep the keys depressed for a period of 5 seconds.
This procedure works independently of the status of Child Lock (if this feature is available) or the VCR adress.

2.4.3 Operation inside the CSM

All deck functions are possible. Functions which need a menu are not allowed.
By the help of the cursor up/down the customer can step through all stored programs.
Toggling between two tables is possible by pressing the MENU button on the remote control.

2.4.4 Deactivation

The customer can deactivate the Customer Service Mode by pressing 'STANDBY' on the VCR.

2.4.5 Contents of the Customer Service Mode

Table 1

```
CUSTOMER SERVICE MODE 1   XX:XX

VERSION    CC XXXX DC XX
DECKERR X X X ER XX XX XX XX XX
RPROT XXX CHILDL XXX  P 50  XXX
DREC  XXX DEC XXX     16:9  XXX
VCR X     REMOTE X    CASS XXXX
PROG XX SYSTEM XXXXX NAME XXXXX
TUNE XXXXXXXXX MOD XXXXXXXXXXXX

MODE XXXXXXXXXX XX PREROLL X:XX
AUDIO XXXXXXXX     HEADPHONE XX
VIDEO XXXXXXXX
WARNING XXXXXXXXXXXXXXXXXXXXXXX
```

XX:XX	Actual time
VERSION CC	Version number of central control
DC	Software version of display controller
DECK ERR E1..3	Deck error code; for an overview of the codes see Step 2 of Service Test Program
ER 0...15	Electrical Error Code according Step 5 of Service Test Program
VCR = 1 / 2	VCR adress
REM = 1 / 2	Last detected remote adress
CASS	Cassette length
RPROT = ON/OFF	Record Protection
CHILDL = ON/OFF	Child Lock
P50 = -/1/2	Easy Link not / release 1 / release 2 active
DREC = ON/OFF	Direct Record
DEC = ON/OFF	Decoder
16:9 = ON/OFF	16:9 screen aspect ratio identification
PROG	program number
SYSTEM	in REC/EE received colour system, in playback system from tape
TUNE	Frequency or Channel (dependent on actual selection) + optional value of fine tuning
NAME	Detected transmitter name
MOD	Modulator 'ON/OFF' or 'NO' in case of RF booster, frequency, audio mode G/K
MODE	Tape deck mode, Record Modes..., last 2 digits: SPEED = SP/LP
PREROLL	actual detected preroll value (default value in case no camera connected)
AUDIO	in Playback: MONO - L - R - ST - MIX; in Record or EE: AUTO/MAN and level value
HEADPHONE	Actual volume value
VIDEO	Smart picture info
WARNING	Last warning info

Table of electrical Error-Codes:

Code	Description	Pos.
0	no error, all expected devices are available	
1	Tuner	7702
2	Modulator	7702
5	OSD/PDC/VPS	7851
7	Audio Processor: no Acknowledge	7651
8	Videomatrix	7506
9	Nicam	1972/7700
10	Stereo Decoder	7771
11	TXT data slicer (not used)	7871
13	EEPROM read/write error	7401
14	Audio Processor: no HP2 detected	7651

Table of Deck Error-Codes:

0	no error
1	threading error
2	no capstan pulses
3	tape broken
4	no pulses left reel
5	no pulses right reel
6	head motor error

Table 2

```
CUSTOMER  SERVICE  MODE  2           XX:XX

YEAR  XXXX      MONTH  XX      DATE  XX
  DATE     PROG     START   V/P  END     LP
1 XXXXX   XXXXX   XX:XX    X    XX:XX    X
2 XXXXX   XXXXX   XX:XX    X    XX:XX    X
3 XXXXX   XXXXX   XX:XX    X    XX:XX    X
4 XXXXX   XXXXX   XX:XX    X    XX:XX    X
5 XXXXX   XXXXX   XX:XX    X    XX:XX    X
6 XXXXX   XXXXX   XX:XX    X    XX:XX    X


V/P  DET  XXXXX
```

Actual time, year, month, date

– Actual timer settings

– V/P: VPS/PDC detection of actual received transmitter 'ERROR/ VALID'

Circuit descriptions

1. Switched-mode power supply PS

1.1 Technical data

Mains voltage:	220-240 V ac ±10 %
Maximum output:	40W
Operating frequency:	55 kHz
Efficiency:	approx. 80 % at max. output

1.2 Functional principle (blocking oscillator)

During the conductive phase of the switching transistor, supply energy is transferred into the transformer. This energy is passed to the secondary part in the blocking phase. Using the switch-on time, the energy transferred in every cycle is regulated in such a way that the output voltages are unaffected by changes in the load or input voltages. The Mosfet [7150] is controlled by the IC [7151].

1.3 Low power stand-by mode

In 'low power standby mode', a large percentage of the 5V load, the 12V supply and the 33V supply on the motherboard is switched off. The power supply then operates with reduced operating frequency (approx. 35 kHz) to reduce the switching power losses in the Mosfet [7150].

The power input is less than 4 Watts in this condition.

1.4 Point of reversal

Maximum output is transferred at this point of the output characteristic.

1.5 Overload:

The power supply operates in Burst Mode. The energy is limited in every cycle, so that the
output power is low **(Fig.1)**.

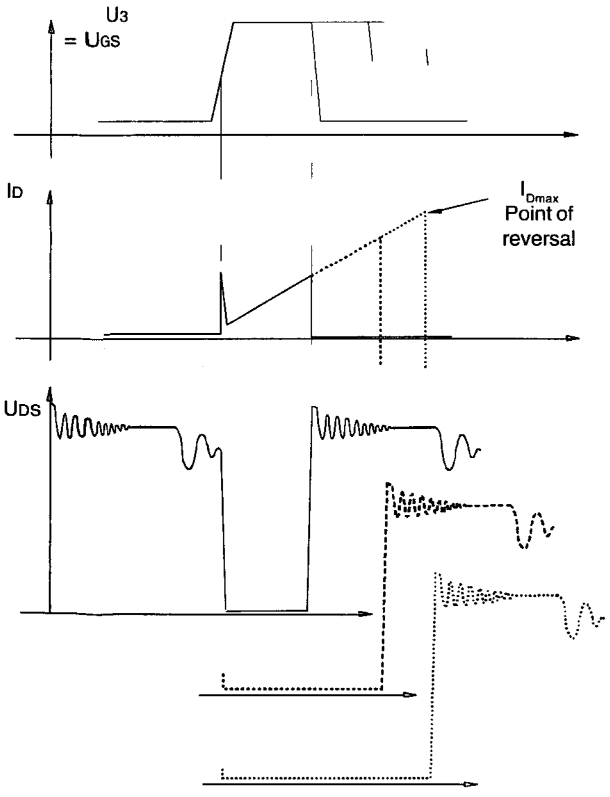


Fig.1

1.6 Circuit description:

There is a filter [5150, 2150] in the supply voltage part, which protects the power supply against any interference from the mains. The mains voltage is rectified by the bridge rectifier [6151, 6152, 6153, 6154] and buffered by electrolytic capacitor [2152]. Electrolytic capacitor [2154] is loaded using charge pumps [2151, 6155, 6156] and [3155] and is used to supply the IC [7151] during the start-up phase. After this, the IC is supplied by transformer coil 1-7 with diode [6157]. During the switch-on time of the switching transistor, a current flows from the rectified supply voltage through the primary coil of the transformer, the transistor and the shunts 7150, 3113 to earth. As the positive voltage at pin 3 of the transformer is constant (for this exercise), the current increases linearly and forms a ramp, depending on the mains voltage and the inductivity of the primary coil (U=L*di/dt). A magnetic field representing a certain volume of the primary current is formed inside the transformer. The secondary voltages are polarised in such a way that the diodes block during this phase. A voltage image of the primary current is passed to pin 7 of the IC [7151] via resistors [3160,3161]. This is checked and, as soon as it reaches a certain value, depending on the control voltage at pin 14 on the IC, the transistor [7150] is switched off.

Once the switching transistor [7150] blocks, no more energy is transferred into the transformer. The inductivity of the transformer now attempts to maintain the current which flowed through it at a constant level. The current, however, decreases (di/dt < 0) and the polarities of the voltages at the transformer reverse, causing a current to flow through the secondary coils of the transformer, the secondary diodes [6164, 6165, 6166, 6169 6170/6171] which are now conductive, and the load. This current is also ramp-shaped but decreasing.

The output voltages in the switched-mode power supply are controlled by changing the length of the conductive phase of the switching transistor [7150] so that either more or less energy is transferred from the supply to the transformer. The control information is provided by the control element [7153]. This element compares the 5V output with an internal 2.5V reference voltage using a voltage divider. The output voltage of [7153] is passed to pin 14 on the IC [7151] via an optocoupler (for galvanic isolation). It compares this voltages with an internal reference. The resulting value is compared with the voltage on pin 7 (equivalent to the primary current). The voltage on pin 5 of the IC [7151] is required for FOLD BACK in case of overloading. The maximum available secondary power is determined by resistors [3113, 3160, 3161]. If the voltage on pin 7 of the IC rises to a certain value (typ. 1V), the power supply enters the reversal point, and power limiting is activated.

Six voltages are made available on the secondary side, which are rectified by [6170/6171, 6169, 6167, 6166, 6165, 6164]. The motor voltage 8-17M2 is switched over with the control line CSW and transistors [7158, 7159].

1.7 Description of the start-up phase

After connection to the mains, the following voltages at the connections on the IC [71511 (Fig.2) rise at time to Vcc (pin 1) corresponding to the half-wave loading via charge pumps [2151, 6155, 6156] to Vccstart. In this case, the current input is typically 03 mA. The IC starts to function when Vccstart is reached (approx. 1 4V), the power intake of the IC then rises to approx. 17 mA. The operating frequency is determined by the capacitor on pin 10 (approx. 55 kHz).

If Vcc drops below the limit value Vdis2 (typ. 9V) before the reversal point has been reached (e.g. with various short-circuits), or if Vcc rises to Vccprot (typ. 16V, e.g. if the control loop is interrupted), the output on the IC (pin 3) is blocked. The IC then attempts to restart **(Fig. 2)**.

Attention: The power supply needs a minimum load of 200mA on the 5V output to start up.
Is the load less than the 200 mA (e.g. defective 5V fuse on the motherboard or the cable from the power supply is not connected the power supply switches to the 'Bust' or 'Hick up' mode.

Start Up and Overvoltage protection:

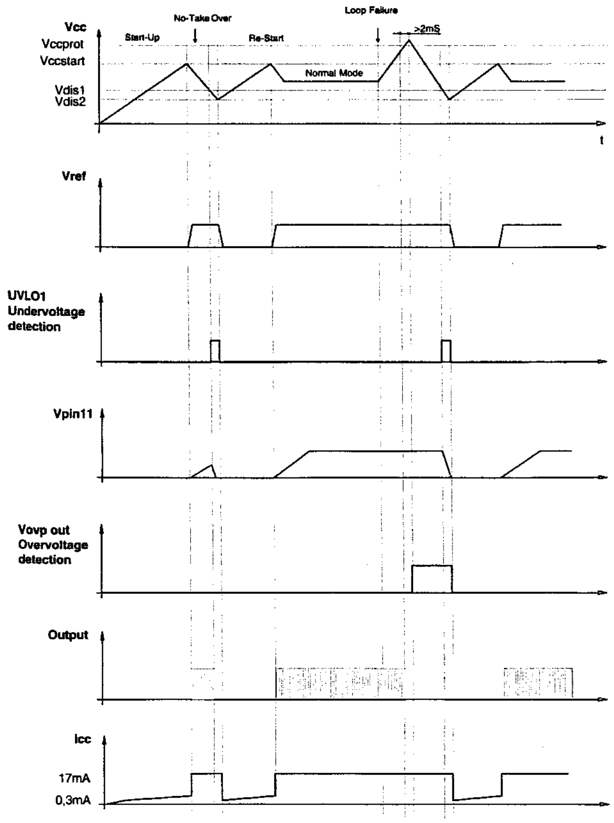


Fig.2

1.8 Normal operation, overload, standby

After start-up, the IC [7151] is in normal mode. The voltage at pin 14 is typically 2.5V. If the load increases on the power supply output, the IC increases the switch-on time for the Mosfet [7150]. The peak voltage value at pin 7 (equal to the primary current in the transformer) also increases. If the load continues to rise, the IC limits the switch-on time for the power transistor [7150] typically from 1 Vpeek at pin 7 on the IC (reversal point).

The IC power supply Vcc from transformer coil 1-7 acts as the secondary voltages. This means that Vcc also reduces with increasing load. When Vcc < Vdis1 (typ. 9V) the IC goes into Burst Mode. The short-circuit power is low, as the interval between the start-up attempts is great.

The switch-on time is shortened if the load is decreasing. If the load continues to decrease, the IC switches the frequency back to approx. 25 kHz (Standby Mode) from a certain voltage threshold at pin 7. This reduces the switching power losses on the transistor.

1.9 Overheating

The IC [7151] contains overheating protection which blocks the output stage if the chip temperature is too high (typ. 155 ºC). The attempt can be made to re-start once the temperature has been reduced.

2. Front end FV and stereo decoder FM_STEREO

2.1 Functional groups

- TUMOD = Tuner + Modulator
- IF amplifier & video demodulat with FM and AM demodulator
- FM stereo decoder TDA 9840
- NICAM decoder SAA 7283/84

2.2 Systems which can be received

- PAL B/G with FM stereo
- PAL 1 or PAL BG with NICAM stereo
- PAL BG with NICAM and FM stereo
- PAL BG/I SECAM L/L' with NICAM and FM stereo
- PAL BG SECAM DIK with FM stereo

All front end variations conform to the EN 55020 standard.

2.3 Tuner/modulator with passive loop through (TUMOD)

Tuner and Modulator are fitted into the same housing. Both the tuner and the modulator are PLL-controlled. The reception frequency or modulator frequency is set using the IIC bus.

The HF loop through to the TV unit is also ensured in LOW POWER MODE (without supply voltage) (PASSIVE LOOP THROUGH).

The amplification is determined by the AGC voltage at pin5 [1701] (for operation, see AGC section).

2.4 IF selection

The intermediate frequency of the picture carrier is 38.9 MHz for all systems except SECAM L' (33.9MHz).

A quasi-split sound system (QSS) is used for all FE variants; i.e. separate surface wave filters (OFW or SAW...Surface Area Wave) are required for the picture and sound carrier [1701,1702].

The sound used OFW (K9456M and K9463M) have two different filter characteristics which can be switched.

For the PAL BG/I-SECAM L/L' variant, an additional circuit for suppressing the adjacent channel sound carrier is provided, which is set using coil [5704] to maximum suppression at 40.4MHz.

2.5 IF demodulator

2.5.1 TDA 981 3T

There are separate internal modules for processing the IF signal for picture and sound.
The output signal of the OFW is initially amplified and then synchronously demodulated. The carrier required for this purpose is regenerated from the input signal via a PLL. The integrated VCO oscillates at double the picture carrier frequency (77.8MHz) and this frequency is set internally. The loop filter for the PLL is connected on pin 5. At pin 20, an AFC voltage (Automatic Frequency Control) is available, which is evaluated for station tuning.
At pin 18, there is a demodulated video signal and the sound carrier at 5.5MHz or 6.0MHz (FM sound) or at 6.552MHz or 5.85MHz (see NICAM sound). After a sound trap, the video signal passes to an internal 6dB buffer (pin 19). A voltage divider and an emitter follower for level adaptation (1 Vpp) are arranged at the output of the buffer (pin 8).
The IC has an output for the sound carrier at 5.5MHz (6.5MHz) and 5.74MHz (6.258MHz). These are connected to the FM demodulators via filters (pins 14, 15). The audio signals are conveyed to the stereo decoder part on the stereo decoder TDA9840T (see below).
For NICAM, a second IF (SSIF) is passed to the QNIC sub-printed board.
For the BG/DK stereo variant, the second audio IF is conveyed optionally to the audio filter pair 5.5/5.74 MHz or 6.5/6.25 MHz via a switchover IC [7708].

2.5.2 TDA 9814T

This IC is operated only in QSS. In addition to the TDA 9813, it also contains an AM demodulator for Secam L, L'. The second audio IF is passed via a switchover IC [7708] optionally to the audio filter pair for FM stereo 5.5/5.74 MHz or a 6.0 MHz filter for PAL 1 reception.

2.5.3 TDA 9812T

This IC is only used for a mono version for the PAL BG/I SEC L/L' variant and is a mono version of the TDA 9814 with identical pinning.

2.5.4 AGC

The two-stage AGC is the same for all ICs. For small signals, the control is only carried out in the IF-IC whilst the tuner operates with maximum amplification. From a certain input level (take over point) a control signal is issued for the tuner from the IF-IC. From this input voltage onwards, the control is basically only carried out by the tuner. The take-over point is set using potentiometer AGC-Adj. [3722] to the optimal sensitivity and input interference immunity. The IF-AGC voltage is supplied to the control-µP via transistor [7707). This is used to determine the sequence of the programs to be stored in Autostore mode.

2.5.5 FM Stereo decoder TDA 9840T

For FM stereo, the signals L+R or 2R are transmitted by the sound carriers. To arrive at the L and R, a decoding circuit is required. This computing circuit is implemented in the TDA9840T. The input attenuators can be set with the IIC bus and are used to adjust the level and set the channel separation. The frequencies containing the stereo recognition or dual tone recognition are filtered out via an LC network. For dual audio or MONO, the aforementioned computing circuit is deactivated.
The de-emphasis is carried out internally by the capacitors [2775 and 2779].
For the variants with NICAM and FM stereo, the output signals for the NICAM part are passed to the output selection switch on the TDA9840T (pin 9,10) and the audio signal is selected in the TDA9840T (outputs pin 13,14) via the IIC bus using software.

3. FM Audio AF

3.1 General

All audio input and output selection switches, and the hi-fi FM audio signal processing, are located in the TDA9616 [7651]. This IC is controlled solely by the IIC bus. The carrier frequencies and bandpass filter for the FM audio part are adjusted by the TDA9616 independently. This adjustment is started via the IIC bus following a mains reset. The HP2 signal is used as a reference for this (pin 40).

3.2 Audio IO

The input and output selection switches are controlled by the IIC bus. Audio signals from the front end, both Scart sockets, the cinch sockets on the rear of the unit, the microphone amplifier and the front sockets, are passed via pins 1 to 10 or 44 to the two input selection switches which select the respective signals for the FM and the linear audio part. The output selection switches for Scart 1, connected in parallel to the cinch outputs; Scart 2 and the headphone output (pins 15, 16, 18, 19, 13, 14) independently select the respective signal sources.

The RFAGC limits the maximum amplitude of the signal to the modulator (AMCO) to prevent overmodulation.

The line TRIA _ ALM passes (controlled by the IIC) the size of the audio signals or the level of the playback envelope curve (during tracking) to the deck processor.

3.3 FM Audio

3.3.1 Recording:

The signal coming from the input selector switch (INPUT SEL) reaches, via a level actuator (VOLUME) and a deep pass filter (fg > 30 kHz), the NOISE REDUCTION block, which compresses the dynamics during recording. The compressed signal is passed to both FM modulators (1.4MHz and 1.8MHz carrier frequencies). Both carriers are added and reach the head amplifier via pin 36. beiden Träger werden addiert und gelangen über Pin 36 zum Kopfverstärker.

3.3.2 Playback:

The signal from the head amplifier is passed to the HF-AGC via pin 37 where the tape and scanner tolerances are compensated. Via the two band pass filter and limiters, the FM signals reach the PLL demodulators. Head change-over interference is bypassed using SAMPLE & HOLD (triggered by the HP2 signal). The demodulated signals are then expanded in the NOISE REDUCTION part. The hi-fi signals are then available at the output selection switches. If no FM playback is present, the IC automatically switches the output selection switches to linear audio.

3.4 Interface to the linear audio

In recording mode, the input selection switch NORMAL SEL in the TDA9604 [7850] selects the audio source for the linear audio part in the signal electronics IC (LA72525) and passes this signal to pin 17 (AMLR).

In stereo sets, the input selection switch on the signal electronics IC LA71525 [7007] is always set to IN2 (pin 73).

During playback, the AMLP signal from the linear audio part in the signal electronics IC (pin 77) is carried via pin 19 from TDA9604 [7850] to the playback level attenuator (NILevel),which can be adjusted in service mode using the IIC bus.

4. Audio linear (AL)

The signal input for recording to loop-through (EE) is pin 73 on LA71525 [7005]. During record and EE, the selected signal passes through the linear amplifier and then a mute stage and before leaving the IC on pin 77. This is output leading to the FM audio part. The attenuation chain on pin 77 sets the required level for the ALC (Automatic Level Control) detector, whose time constant is determined at pin 72, and the level for the recording amplifier. L5601, R3615 and C2610 form the pre-emphasis for the recording amplifier.

The output for the recording amplifier is pin 1. The recording current is then added to the bias current via resistor [3622] and flows via the head to pin 5, where the switch is closed. During playback, the switch at pin 7 is closed. The playback signal is amplified during the equalizer stage (time constant between pin 8 and pin 10. The resistor [3629] and the capacitor [2622] determine the head resonance during playback.

In longplay mode, the frequency characteristic is adjusted with RC networks [C2611, R36151 for record and with [C2612] for playback.

The erase oscillator supplies a signal with approx. 70 kHz for the audio erase head and the bias current. To avoid interference, the oscillator should be switched on and off slowly (switching stage T7604, time constant C2609, R3617, R3610).

The bias current is set using potentiometer [3626]. The maximum current for the oscillator circuit is limited to approx. 60mA using R3611 and the base current divider resistors on T7604.

5. Head amplifier (HA)

5.1 FM audio part

Head amplifier IC STV5712 [7104]

5.1.1 Recording

Pin10 SW REC switches to record. The inverter switch 7102 protects against deletion if the power supply is interrupted.
The recording current signal is supplied from the FM audio processor TDA9616 to input VIN pin 11.
Pin 15 IOUT acts as a current source for the recording current to the heads.

5.1.2 Playback

One low-noise playback amplifier for each head is switched into the signal path via the head selection switch SW_H pin 9. The FMAP output leads to the FM audio processor TDA9616.

5.2 Video part

Head amplifier IC STV5744 [7103] (4 heads), STV5742 [7108] (2 heads)

5.2.1 Recording

FMPV is the input for the switchover to REC using switch 7105. REC IN is an addition point for the recording current signals luminance, PAL chroma and SECAM chroma.
IOUT acts as a current source for the recording current to the heads.
The current through 3114 on TRIV acts as a current reference for setting the recording current. Pin 18 or 14 is also an input which is used to control the recording current.
7107 switches with 4 head devices and SP recording, a resistance parallel to 3114 and therefore allows the required increase in recording current for SP.
The Record AGC is only specified during CSYNC2 = H.

5.2.2 Playback

FMPV is the output for the playback signal to the video processor LA71527.
One low-noise playback amplifier for each head is switched into the signal path via the head selection switch SWIN.
The voltage at TRIV supplies a direct voltage proportional to the signal strength from FMPV, which can be evaluated for the automatic tracking.
For picture search, the SP and LP heads are changed over using the next rising edge in the CSYNC2, in other words, at the end of the line in the non-visible area.
ISWS short-circuits the unused head pair to the amplifier inputs, thereby correcting the crosstalk in the ring transformer in the scanner.
ENVC supplies the information as to whether or not the signal is greater than the SP or LP heads.

6. Video Signal Processing VS, SECAM L-chroma processing VS-SEC, chroma noise reduction CNR

6.1 Switchover functions in the signal electronics IC LA71527

The signal electronics IC LA71527 [7005] are controlled by the control-µP via the IIC bus on pins 63 and 64.

REC/PB
via the IIC bus
During RECORD pin 19 (REC HIGH OUT) goes to 5V

PAL/SECAM/MESECAM/NTSC
Via the IIC bus
During NTSC playback, pin 43 goes to 5V

SP/LP/SLP
Via the IIC bus

VIDEO ENTRY
At pin 33 (FFP), the artificial picture pulse for the playback features is entered:

Loop through	< 0.8V
Artificial picture pulse	> 3.7V

COLOR VECTOR
The color vector is adjusted using pin 67 (CSCP):
Normal < 0.8V
LP features color = HSC signal

6.2 Recording :

6.2.1 Luminance

The input signal (VBS) is available on the IC [7005] pin 35 as FBAS with 1Vss. In the IC [7005], the video signal first passes through an amplification control (time constant determined by C [2035]). Following the AGC, the signal reaches a terminal stage, is attenuated by 6 dB and goes via a 3.5 MHz deep pass filter to the chroma disconnection to the vertical emphasis (out: pin 42, in: pin 40). This emphasis comprises a 1 H-CCD delay line in the IC [7003] (in: pin 5, out: pin 7) and an emitter follower [7004]. The signal then travels via another emitter follower 7006 from pin 25 to pin 26. The filter does not function in REC mode on the basis of the emitter follower, due to the low resistance of the emitter follower. The Y signal then travels through the detail enhancer, the non-linear emphasis, the linear emphasis (time constant via pin 23,24) and the white/dark clipping stage.
The signal generated in this way then control the FM modulator directly. Before the FM signal leaves the IC [7005] at pin 18, it passes through a further low pass filter. Then it is passed to the chroma signal via an external emitter follower [7008) and RC cell as FMRV in the head amplifier addition point.

6.2.2 Chrominance PAL

The chroma signal is separated from the incoming videosignal (pin 35) by a band pass filter (BPF1) and reaches an ACC stage. The ACC amplifier stage controls the chroma amplitude for the subsequent stages (time constant via capacitor [2057] on pin 13). The chroma signal is then conveyed to the main converter. The main converter mixes the 5.06MHz subcarrier on the auxiliary converter with the 4.43 MHz chroma signal to the 627kHz chroma FM signal.

The subcarrier is a mixture of 4.43MHz (the REC APC time constant on pin 54 compares quartz and burst frequency) and (40+ 1/8) fH = 627kHz (produced by 321fH -VCO, time constant pin 49/51 and phase rotation in accordance with the VHS standard, control pin 66). Via a band pass filter and the color killer stage, the converted chroma signal reaches pin 14 on the IC, where it is added directly to the Y FM signal via an adjustment controller [3118]. The color killer can either identify the incoming signal itself (PAL yes/no, PAL: chroma signal out, SECAM L: chroma signal killed) or can be set to PAL or SECAM L via the IIC bus. The quartz oscillation (pin 56) is used for chroma processing, in addition to the reference frequency, and also for generating the pulse frequency for the combined CCD [7003, pin 10] and for the chroma noise reduction-IC [7807, pin 10].

6.2.3 MESECAM

The signal path is virtually identical to the path for PAL.

The differences are:

- No phase rotation.
- The filter characteristic for the chroma band passes becomes wider.
- Free-running quartz frequency
- The control-µP generates the control signal for MESECAM via the IIC bus

6.2.4 SECAM L

The FBAS signal (VBS) from the in/out part reaches, via the emitter follower [7068] the bell filter (cloche), which returns the emitter-side HF pre-emphasis. In Secam L- IC pin 29 [7066], the signal goes through a 15dB amplifier and a frequency divider. This generates the 1.1 MHz signal required for the recording using frequency separation (1:4) on the chroma signal. This signal is then connected to pin 21, followed by a band pass filter. The band pass filter suppresses the harmonic waves which occur during the frequency separation. At the same time, the chroma signal is blanked at this point during the line synchronous pulse period. It then runs through a 10dB amplifier and is connected to pin 15 on an anti-cloche filter. This produces the FM pre-emphasis again, which is provided as standard for a Secam chroma signal. This is then added to the Y-FM signal via and adjustment controller [3076] as CSRV signal to the head amplifier addition point.

6.3 Playback:

6.3.1 Luminance

The FM playback signal goes from the head amplifier [7103/ 7108] to the signal electronics [7005], pin 15 as FMPV. In the IC [7005], the level of the envelope curve is first controlled and then filtered in FM processing. On pin 17, the signal exits the IC, runs through a phase shifter and a transistor stage to adjust the filter characteristics and re-enters the IC [7005] on pin 20. The FM signal limited using the double limiter is demodulated and filtered using a deep pass. The demodulated Y signal is also affected by the recording-side pre-emphasis. This now removes the linear de-emphasis at the base of the emitter follower [7006]. The filter circuit is effective, as pin 25 becomes an open collector output in playback mode, whose load impedance is determined by the de-emphasis circuit. Using a peaking stage, frequencies are raised by approx. 2 MHz (time constant pin 22).
The Y signal is then terminated, filtered by a low pass, and carried by a vertical noise canceller or dropout compensator. For this purpose, the Y signal leaves the IC [7005] (out: pin 42, in: pin 40) and is delayed by 1H in the IC [7003]. The CCD-1H delay line is effective for the Y signal first as a comb filter (vertical noise suppression) and secondly as a line storage device for the dropout compensation.
The subsequent switching stages are: The non-linear de-emphasis, horizontal noise canceller and the picture control switching to the increase in edge steepness (sharpness). The chroma signal is then added to the luminance signal and output as a FBAS signal (pin 38, VSB).

6.3.2 Chroma PAL

On pin 15, the FMPV signal is carried from the head amplifier to the IC [7005] signal electronics. From the FMPV signal the 627-kHz chroma signal is filtered using the internal low pass. The ACC amplifier amplifies and controls the chroma amplitude. To reduce the low frequency chroma flickering, an additional capacitor [2054,2056] is connected during playback for each video head. The switchover is carried out using the CROT control signal. During feature mode, no capacitors are connected (CAGC = High) to ensure fast chroma control.
In the main converter, the chroma signal is mixed with 5.06 MHz back to the original 4.43 MHz. The 5.06 MHz are produced in playback from the free-running quartz oscillator and from the (40+1/8) f_H = 627 kHz frequency derived from the $321f_H$-VCO. After the main converter, the chroma signal is mostly freed of crosstalk from additional traces using 2H comb filter [7003]. The chroma signal is then filtered using a band pass, checked by the color killer, looped through via pins 46 and 45 (or passed through the chroma noise reduction IC [7807]) and then added to the Y-signal.

6.3.2.1 Chroma noise reduction

The amplitude and phase noise from the chroma signal is improved by the CNR-IC [7807]. The CNR-IC [7807] is a recursive comb filter comprising 2-line CCD and feedback loop. An accidental color shift is caused by the mean value generation across several lines. To prevent this color shift, the chroma noise reduction is switched off at vertical step changes (high on pin 17 [7807]). To detect vertical step changes, the Y signal (pin 42 [7005]) is compared to the Y-signal which is delayed by one line (pin 40 [7005]). The difference in levels is compensated using adjustment controller [3817]. The detection threshold is determined by the voltage fall at resistor [3806].
The chroma noise reduction only functions for PAL signals.

6.3.3 Chroma MESECAM DK

The signal path is virtually identical to the path for PAL.

The differences are:

- The 321 fH VCO is synchronised by the Sync.
- No phase rotation.
- The comb filter is not active.
- Internal band pass filters have a larger bandwidth.
- The control-µP generates the control signal for SECAM B/G via the IIC bus

6.3.4 Chroma SECAM L

During playback, the FM signal from the band (FMPV) is carried to pin 23 [7066], amplified by 6dB, conveyed over the same band pass as for recording, and amplified again by 10dB. After pin 16, the NF pre-emphasis for recording is reversed. The anti-cloche switching in recording is used here as cloche switching.

In the following stages, the signal is adjusted (AGC) and the frequency of the signal is doubled. The band pass on pin 10 frees the signal from interfering harmonic waves, before the signal is doubled in frequency once more. So that the signal becomes a standard Secam chroma signal, it is provided with an HF pre-emphasis again (anti-cloche). Finally, the chroma signal runs through a color killer stage, a band pass filter and an emitter follower [7067], before it reaches pin 45 of the signal electronics 7005 IC as a CSP signal via a coupling capacitor.

6.3.5 NTSC

During the playback of NTSC signals, the original NTSC chroma is converted into a PAL chroma signal (see above for control signals). This requires an IC-internal switchover in the chroma part, but also a switchover in the CCD-IC [7003] to a 1H comb filter to the crosstalk reduction (PAL 2 lines). Line and picture frequencies remain unchanged in accordance with the NTSC standard.

6.3.6 PAL M,N

As for chroma PAL (7.3.2).

7. Input / Output (IO)

7.1 Video:

The entire video-I/O is carried out using the matrix switch STV6401 [7506], which is controlled by the controller via the IIC bus (SDA,SCL). To do this, the following signals are connected to STV6401 at the inputs: Front end video (VFV) pin 4, video in EI (VIN1) pin 6, video in E2 (VIN2) pin 8, video out (VOUT) pin 10 and front video (VFR) pin 12. The outputs OUT3/pin 15 and OUT2/pin 16 are fitted with a 6dB amplifier in the IC and convey the signal to the respective Scart socket. OUT1/pin2 has no amplifier; this signal (VBS) is passed on to the following parts of the circuit for further processing: VS, VS-Secam, VPO (VPS/PDC/OSD), Follow Me.

The VOUT signal is also passed to the modulator via emitter follower [7709].

7.2 Decoder operation (REC or E to E)

7.2.1 Program position with decoder (front end)

The front end signal (VFV or AFV1/2) is passed to the decoder connected to Scart 2 and from there, goes back to the VCR via VIN2 or AIN2L/AIN2R.

External input with decoder (7.2.2) is not possible for these program positions.

7.2.2 External input with decoder

The signal from Scart 1-In (normally TV set) is passed to the decoder connected to Scart 2. For scrambled programs, the decoder switches the pin 8 to high. The VCR then passes the decoded signal from Scart 2-In to Scart 1 Out.

8. Central control & deck electronics AI01, AI02, DE

8.2 SAA 1310 Interface drive electronics

8.2.1 CTL stage

The IC SAA 1310 contains a read/write stage for the CTL track with the option of overwriting an existing CTL track without any interference. The playback stage is fitted with a "digital" two-stage AGC. This logic circuit identifies the size of the output signal supplied by the CTL head, and then selects the best amplification ratio in the playback stage using comparators. The CTL head voltage can vary greatly due to the different tape speeds. The slowest tape speed is in LP mode. The highest speed is used during INDEX SEARCH. To ensure that the duty cycle in the tape sync is always reproduced correctly in the conditions mentioned above (important for detecting VISS marks), the amplifier must not be overdriven. The two-stage AGC alone cannot cover the large dynamic range of the input voltage. The amplifier is therefore also equipped with an internal low pass characteristic. Furthermore, the transistor [7442] is used to further reduce the amplification for all WIND modes. In this case, the signal IWIND ="L" and T7442 are blocked. If T7442 is blocked, the amplification is mainly determined by the internal negative feedback resistors on the SAA 1310, [7443] and the external resistor pos. 3373. The CTL head signal amplitude in SP is approx. 1 mV pp (typ.). The polarity of the playback amplifier can be switched over using line VISS (Video Index Search System). This is the only way it is possible for the µP to write a VISS mark onto the tape without spikes. The Write/Read (W/R) signal is used to switch over between record and playback: W ="H", R ="L".

8.2.2 POR (Power On Reset) - generator

The POR generator contained in the SAA1310 [7443] only requires one external capacitor [2476], which specifies the length of the POR pulse. For 33 nF, tPOR is approx. 30msecs. The response threshold of the reset circuit lies between 4.5 and 4.8 V. Supply fluctuations which are shorter than tPOR/100 area and which do not fall below 3.5 V, do not trigger the POR. The operation-µP and the control-µP are reset using the inverted POR.
There is an additional line which runs from the control-µP to the operation-µP (IDC-RESET) which can reset the operation-µP.

8.2.3 The sensor interface

The four comparators in the SAA1310 [7443] are used to convert sensor signals to the logic level. Two of these comparators have open collector outputs (pins 11 and 13), which can switch a current of 100 mA. The outputs are overload protected by a current limiter and thermal shutdown. Only the non-inverting input on each comparator is accessible from the outside. The other inputs are connected to an internal reference of nom. 2.5V. The fixed hysteresis of the comparators of approx. 10 mV is also located internally. The sender diodes on FTA and WTR are supplied with a pull-up.

The comparators are connected as follows:

Comparator 1:
In = FTA, pin 5; Out = FTAD, pin 15:
FTA = threading tachometer. This signal comes from a forked light barrier in the deck. An infra-red light beam is interrupted by a 4-blade impeller (butterfly). For a correct evaluation, the output amplitude of the photoelectric barrier must fluctuate at least between the voltage levels 1.5 V and 3.5 V. An additional hysteresis is created with a resistor.

Comparator 2:
In = WTR, pin 6; Out = WTRD, pin 14:
WTR = Winding tachometer right, from a reflection photoelectric barrier. The level is the same as for the FTA.

Comparator 3:
In = WTL, pin 7; Out = WTLD, pin 13:
WTL = Winding tachometer left, from a reflection photoelectric barrier.
The level is the same as for the FTA.

Comparator 4:
In = FG, pin 8; Out = FGD, pin 11:
FG = capstan tachometer. This signal stems from an amplifier for the tachometer hall sensor on the motor unit. The output impedance is 10 kOhm. The amplitude of the near sinusoidal signal is normally 1 Vpp . It should not fall below 300 mV PP. It is AC-coupled via a capacitor [2490]. In order for a bias current to flow, the input pin 8 must be passed via a resistor [3378] to the reference voltage on pin 3. A capacitor [2474] for filtering out high-frequency interference is arranged in parallel to the bias resistor.

8.3 Interface to head drum motor driver

The head drum control voltage (speed and phase control information) is output via a µP-output (7406/pin 87; PWM 14-bit). This pulse-wide modulated signal is fed to the head drum motor driver IC TDA5241 (7446/pin 13) and integrated with the capacitor [2492]. This IC already has a completely integrated 'start-up' circuit fitted. For the commutation, the head drum motor driver uses the electromagnetic energy (EMF) on the non-current carrying motor coil (transformer principle). The motor speed is also discharged from there at the same time. The phase of the head disc is discharged from a position coil. Speed and phase are multiplexed into one signal (PG_FG, 7446/ pin 6). During this process the falling edge of the signal is the speed (FG/ 450Hz) and at 25Hz the position pulse (PG) has a positive edge.

The connection from the HMO driver TDA5241 [7446] on the motherboard to the head drum motor is made using plug connector 1948.

The current input from the +14VM1 is normally 70mA at room temperature. During acceleration of the motor, approx. 0.5A may flow for a short period.

8.4 Interface to the capstan motor

The driver IC on the capstan motor is activated via connector 1946.

CAP is the signal for the capstan speed. This voltage may vary without load between 0 and 5 V. The rotational direction of the motor is determined using CREV (capstan reverse). The maximum current input for the motor is limited to 1A. Typical values in PLAY mode are 0.2 ... 0.3 A.

8.5 Loading motor driver

The TMO driver uses a bridged dual power op-amp L2722. The element can supply +/-1 A output current. It contains short-circuit and thermal overload protection and integrated flyback diodes on the outputs. The output current is limited to approx. 0.7A by the internal resistance of the loading motor (18 Ohm typ.) (start-up or motor is blocked). Between the IC outputs (pins 1 and 3), a "Boucherot" circuit (1 Ohm, 100 nF) suppresses a spurious 3MHz oscillation from the output stage. One half of the bridge is controlled via the TMO line and acts as a comparator. The other half is an amplifier integrator with a 3.9 gain. A change in the input voltage (THIO) of between 0 and 5V results in a change in the output voltage of between 0V and almost Ub. With 50% modulation (THIO = 2.5 V) pin 3 has approx. 7 V. The capacitor in the negative feedback of the op-amp filters out the PWM frequency of approx. 39kHz. During POR, the µP issues "L" to the THIO line, whilst TMO is "H". In order to ensure that no current flows in the motor during the POR pulse, the aforementioned polarity must be maintained. This prevents the motor being destroyed in case of prolonged running or blockage. This circuit, however, also has the disadvantage that if the 5 V supply fails (e.g. because the 5V fuse has blown), residual voltages may be passed to the IC inputs via the adjacent 14 V voltages. These residual voltages trigger the comparator and the op-amp is opposite ways, causing a short-circuit in the blocked loading motor after one minute. In order to avoid this, a separate voltage divider [3385,3382] is used for the comparator. Both output on the L2722 [7440] are then in "common mode" if this error occurs.

8.6 Analog interface to the µC

The following analog levels are supplied to the µC's internal A/D converter:

TRIV	Tracking Information Video
TAE/TAS	Tape End / Tape Start Detection
INIT	INITialisation (drive switch)
RECP	RECord Protection (drive switch)
AGC	Automatic Gain Control (front end)
TRIA_ALM	Tracking information audio/ audio level information

8.7 Tape end - LED control

The LED current is switched using transistor at pos. 7407. The ON time is approx. 1 msec with an ON/OFF ratio of 0.09.
The LED current is normally 180 mA. In order to prevent interference from the relatively high pulsed current 'spreading' through the entire unit, the LED is fed from the 14VM1, and filtered by 2 NFRs (Non Flammable Resistor) [3426,3431] with 10 Ohm each and a 220µF electrolytic capacitor [2406].

8.11 EE-PROM

The R/W cycle is carried out via the fast IIC bus SDA3, SCL3. In the EEPROM, parameters specific to the device or the deck are stored, together with the preset stations and some options.

The head changeover position is adjusted automatically with a test cassette in the service test programme.

8.12 CMT detection (video detection)

This has been extended due to identification problems with weak transmission signals and video signals not conforming to the STANDARD (common channel interference). The CSYNC line is supplied to the µP on pin 33. A hardware integration of the picture pulse compensates the interference generated by the common channels and weak signals.

8.13 Micro-controller (TMP93C071 F)

The micro-controller (7406) is a high-speed 16-bit micro-controller (ROMless) combines the following functions:

- external ROM range of 16Mbyte, addressable
- 8 Kbytes internal RAM
- 8-bit A/D converter (16 channels)
- serial bus interface: - 2 serial, 2 IIC bus, 1 UART (RXD/TXD) PWM outputs: - 3 x 14bit, 9 x 8bit
- composite sync input - special servo inputs

The component is used in QFP (120 pin).

There are 16 analog inputs available. The resolution of the A/D converter is 8 bit. The maximum input voltage range which can be processed is 0 ... 5V (determined by the reference voltages ADREF pin12 and ADGND pin13).

12 analog/PWM outputs - 3 with 14-bits and 9 with 8 bit resolution, are available. The outputs supply a signal with a constant frequency (approx. 39kHz) and a variable duty cycle.

8.14 External RAM CY62256 (7452)

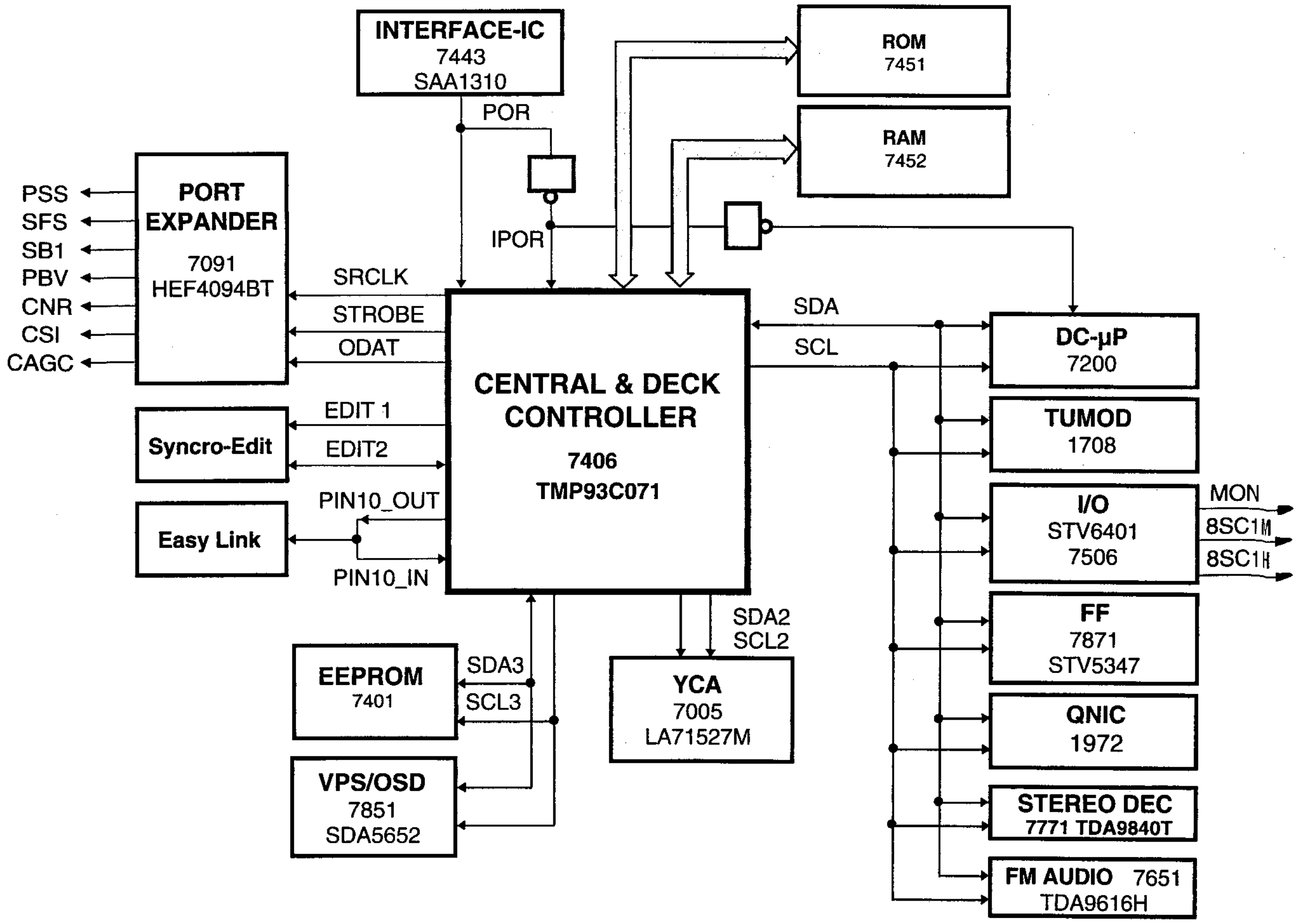
Currently, an external RAM of 256kBit (22k x 8bit) in size is being used.

8.15 External ROM M27C4001 (7451)

Current external ROM of 4Mbit (512k x 8bit) requires a specified access time of ≤ 100ns.

8.16 Port expander PE

The shift register [7091], is controlled by the control-µP via the lines SRCLK, ODAT and STROBE, and is used as the port expansion for the microprocessor.


INTERFACE-IC
7443
SAA1310
POR
IPOR
ROM
7451
RAM
7452
PSS
SFS
SB1
PBV
CNR
CSI
CAGC
PORT
EXPANDER
7091
HEF4094BT
SRCLK
STROBE
ODAT
EDIT 1
EDIT2
Syncro-Edit
PIN10_OUT
Easy Link
PIN10_IN
CENTRAL & DECK
CONTROLLER
7406
TMP93C071
SDA
SCL
DC-µP
7200
TUMOD
1708
I/O
STV6401
7506
MON
8SC1M
8SC1H
FF
7871
STV5347
QNIC
1972
STEREO DEC
7771 TDA9840T
FM AUDIO 7651
TDA9616H
SDA2
SCL2
YCA
7005
LA71527M
EEPROM
7401
SDA3
SCL3
VPS/OSD
7851
SDA5652

8.17 Easy Link (P50)

For the communication between the TV set, video recorder and the peripheral devices, a bi-directional single-wire bus is used, which runs via pin 10 to Scart socket 1. In connection with the Scart connection on pin 8, various video recorder functions activate actions on the TV and vice versa.

9. Follow Me part (FOME)

The video signal from the internal front end of the VCR (VFV) and the VBS signal, which, when compared, corresponds to the TV front end video signal connected to Scart 1-Input (VIN1; i.e. the input selection switch in the I/0 on In2 pin 6/VIN1), are „digitised“ via comparators and are then compared. Low at the output of the circuit (FOME signal - 0.8V) shows that the picture contents of both video signals are identical and that both receiver parts (TV & VCR) must be tuned to the same station (possible errors in detection may occur with similar signals, e.g. news programmes).

10. VPS/PDC, on-screen display VPO

10.1 General

The combo-IC SDA5652 [7851] contains both a data slicer for VPS/PDC decoding and the entire on-screen display function. The IC is controlled via the fast IIC bus (approx. 330kHz/ SCL3 or SDA3). As, during the current production runs, the IC is being changed to a type with integrated H-PLL, it is possible to differentiate both variants using a readable register (version no.: processed in the software).

10.2 PDC/VPS

The VPS/PDC decoder part on the SDA5652 [7851] reads from the vertical blanking gaps and the VPS and the PDC data and stores this information in the IC's internal RAM (read out by the controller via the IIC bus). The time can also be read from the TXT header line (required for "Time download"). The date is not called up from the TXT header, but only via PDC format-1 (various write versions of the preset stations).

As the input signal for the data extraction, the video signal from input selection switch (VBS) is connected from the I/O to pin 17 on the IC via a coupling capacitor.

The following modes (data formats) are identified:

- VPS (Timer data and sender name)
- PDC Format 2 (Timer data and station name)
- PDC Format-1 (station name and date and possibly time)
- TXT header line (time for 'Time Download')

10.3 OSD part

The VPO-IC SDA5652 facilitates both the generation of the keyboard matrix into a video signal and the generation of an entire picture (full page) for menu-control or if no background video is available.

The video signal VSB passes from the signal electronics to the input on the OSD-IC (pin 18). From output (pin 15), the signal is conveyed via emitter follower [7854, 7855] and the low pass filter in-between [5854, 2864, 2865] as VOUT signal to the I/0 or modulator. The low pass has a limit frequency of approx. 8MHz and is used to suppress harmonics which are produced by the OSD part (bandwidth limit for the video signal).

As the system clock frequency, the doubled color subcarrier oscillation from the signal electronics is used (2FSC/8.86 MHz) which is connected via a selective emitter follower [7002] at pin 3 on the IC. For the vertical synchronisation of the keyboard matrix, an OSD frame pulse (OFP) is generated by the controller and passed to the IC on pin 9. The horizontal arrangement is made on pin 7 on the IC via an H-sync which is separated out from the video signal. In the case of the keyboard matrix in Secam signal, a bypass is activated between video-in and video-out via a switch inside the IC and a series resonant circuit [5852, 2857].

So that the keyboard matrix remain stable and readable with slightly distorted video signals (noise, common channel, trick play mode ..), an H-PLL is required for the horizontal synchronisation. As the internal H-PLL has not functioned perfectly in the first OSD-IC version, the H-sync required is generated from the VSB signal using the PLL-module BA7046F [7857]. The free-running frequency in the H-PLL is determined by resistor [3884] (130 kOhm/±2%) and is approx. 15kHz. This H-sync is available on pin 2 on the PLL-IC, and is connected directly to pin 7 on the OSD-IC. The VSB signal is attenuated by 6dB using an emitter follower or limited to a band of approx. 500kHz [7856, 3881, 3882, 2868] and connected to a coupling capacitor [2869] on pin 6.
With the improved/second OSD-IC version (transfer is currently in production), the horizontal sync pulse is generated by the IC itself via an internal sync-separator and then a connected internal H-PLL from the signal (VBS) connected to pin 17. When using this OSD-IC type, the external PLL (BA7046F [7857]) including peripheral circuits is no longer required.

During full-page OSD (menu, no video signal, ...) neither a vertical-sync (OFP) nor an H-sync is required, as in this mode, the OSD-IC generates everything from the system clock frequency, i.e. from the 2FSC signal.

11. NICAM decoder SAA 7283/84ZP - QNIC

The IC SAA7284 is an NICAM decoder which does not require any adjustment. It is arranged on the sub-printed board QNIC. The NICAM signal is filtered out by internal filters and is converted into the basic band. The signal is then demodulated and decoded. The digitised audio signal is converted into an analog signal via a D/A converter. In addition to the NICAM decoding, an audio switch is available (inputs pin 7, 16) via which the internally demodulated or external audio signals can be selected.

This switch is used to switch over to the FM audio or AM sound with SECAM L/L' in case of incorrect NICAM decoding or a NICAM carrier not being available.

Two low passes with an amplification of approx. 6dB are connected to the output which remove the residual carriers from the audio signal.

12. Operating unit DC

The front controller [7200] is the core element of the operating unit, fulfilling the following tasks with the respective functional groups:

- shuttle evaluation
- evaluation of the keyboard matrix
- decoding the remote control commands from the infra-red receiver pos. 7220
- quartz clock
- integrated RAM to store timer data
- activation of the display
- 12C bus interface (SDA pin 20, SCL pin 21) to the motherboard

In case of a power failure, the back-up cell on pin 33 supplies the clock and the RAM corresponding to the value of 2200 (220mF gold capacity ... 7 hours). A diode [6200] prevents the back-up cell from discharging. During this time, pin 2 is at LOW level, so that further functions on the IC are switched off using the system quartz [1261] at pin 13 / 14.

12.1 Shuttle:

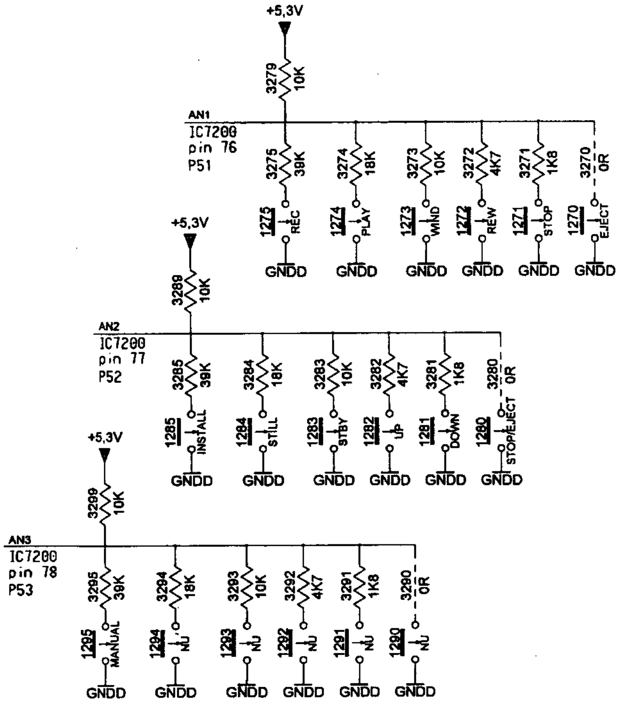
The shuttle EVQ WMH001 represents a binary coded rotary switch with a rotation angle of +/- 70 degrees and 16 switch positions. A spring returns it to the centre position once released. From this position, it can be moved in both directions by 7 or 8 switch positions. All switching conditions are realised using the various electrical connections for the four different shuttle outputs B1 - B4 with a voltage of 5VD (level lift 0V/5V). These shuttle signals are read and evaluated on the input ports P40, P41, P42, P43 on the front controller.

12.2 Evaluation of the keyboard matrix:

There are 18 different keys which are decoded by 3 ports (P51, P52, P53) via 6 assigned DC values each. Pressing keys simultaneously may lead to undesired functions.

Critical functions such as RECORD and INSTALL cannot be activated accidentally by pressing more than one key at the same time.

Schematic:



12.3 IR receiver and signal evaluation

The IR receiver [7220], which is only operational if the voltage 5VD is present, contains a selectively controlled amplifier and a photo-diode. The photo-diode changes the received transmission (approx. 940nm) in electrical pulses, which are then amplified and demodulated. On the output of the IR receiver [7220], a pulse sequence (level lift 0V/5V), which corresponds to the envelope curve of the received IR remote control command, can be measured. This pulse sequence is read into the front controller via the interrupt input P30/INT3 for further signal evaluation.

12.4 Generating the clock pulse

In the operating modes NORMAL, LOW POWER, STANDBY and MAINS OFF, the front controller and the sub-oscillator [1262] generate the clock pulse as the basis for the internal clock and date function. At port P22/XTOUT, a sinusoidal oscillation of 32.768kHz, with a level of approx. >3 Vpp can be measured with a 10:1 probe.

With the back-up capacitor [2200] fully charged, the back-up time is 7 hours.

12.5 Activation and function of the VFD display

In principle, the VFD display [7202] is a tube triode in which the heating filaments in the tube serve as cathodes (F1,F2). The activation of the 9 VFD grid (G1 - G9) is carried out via P67 - P77 on the front controller, and that of the 18 anodes (P1 - P18) via ports P80 - P87 and P90 - P97 on the front controller, each with a positive potential compared to the cathode. The anode P17 and P18 are activated statically from port 06 (pin 31) and port 07 (pin 32) via transistors 7242 and 7243.

The grids and anodes (digits and symbols to be displayed) are activated in the time-multiplex procedure (duty 1:10, scanning period 2.11 ms (9 x 235 µs), voltage lift 5V/-28V). A dimmer function is realised using pulse-width modulation of the grid-activation signals. At maximum display brightness, the pulse-width for each grid is 214 µs. With the help of software, this can be reduced in several stages to approx. 30 µs, which visually reduces the brightness of the VFD display accordingly.

A digit or symbol is only illuminated if the corresponding anode and the surrounding grid are switched simultaneously to 5V for a certain time within a scanning period. The electrons emitted from the cathode are accelerated by the positively charged grid and hit the luminous layer of the anode which is also positively charged.

During the remainder of the scanning period, the corresponding grid and parts of the anode are at -28V, due to the internal pull-down resistors in the front controller. This potential is still lower than the average cathode potential of approx. -16V, prevents the acceleration of electrons, thus causing the relevant grid and anode segments to go dark.

The heating voltage for the display is derived from the 14VDC voltage in the power supply. An AC voltage is generated via a chopper on the motherboard. This is passed via lines HEHI and HELO, on to the limit resistors [3257,3258, 3259) and the interference suppression coil [5001] at pins F1 and F2 in the VFD display. The Z -diode [6250] terminates the heating voltage via a resistor [3250] to approx. -16V. Measure directly between the pins F1 and F2, the heating voltage is normally +3.5Veff.

12.6 Headphone amplifier (ACP3)

The IC TDA7053A is used as the headphone amplifier. However, the bridge amplifier function on this IC is not used. The output voltage on the IC is limited to around 100mA per channel.

The volume is set using a PWM output on the microprocessor. The PWM signal, filtered via the filter switch, is present as a DC voltage on pins 2 and 8, whereby voltages under 0.3V switch the headphone output to mute. The maximum volume is reached at around 1.2V.

12.7 Microphone amplifier

A two-stage transistor switch forms the microphone amplifier. The amplification for the first stage is around 35dB (at a source resistance of 600Ohm). The second stage amplifies by around 27dB.

PRINTED CIRCUIT BOARDS

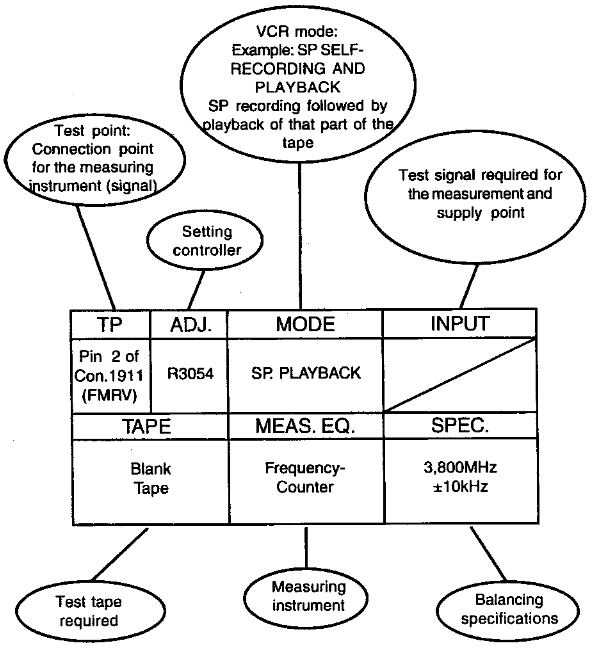
Instructions for electrical balancing

Measuring instruments

1. Dual trace oscilloscope
   - Voltage range :0.001 ~ 50 V/div
   - Frequency :DC ~ 50 MHz
   - Probe :10:1, 1:1
2. Digital voltmeter (DVM)
3. AF millivoltmeter
4. Frequency meter
5. Sine-wave generator
   - Sine-wave : 0 ~ 50 MHz
6. Test pattern generator with stereo modulation
7. VHS alignment tape 4822 397 30103

SPC alignment tape 4822 397 30268

Key to the balancing guidelines:


VCR mode:
Example: SP SELF-RECORDING AND PLAYBACK
SP recording followed by playback of that part of the tape
Test point: Connection point for the measuring instrument (signal)
Setting controller
Test signal required for the measurement and supply point
TP
ADJ.
MODE
INPUT
Pin 2 of Con.1911 (FMRV)
R3054
SP. PLAYBACK
TAPE
MEAS. EQ.
SPEC.
Blank Tape
Frequency-Counter
3,800MHz ±10kHz
Test tape required
Measuring instrument
Balancing specifications

┐┌ ... antenna input

AV ... Euro AV-socket (Scart)

1. Power supply ASM (PS)

1.1 Setting the output voltage +5A (3179):

Purpose: Set supply voltage to the correct value.

Indications of incorrect setting:
The VCR functions will not work correctly.

TP	ADJ.	MODE	INPUT
1115/3,4	R3179	Playback	
TAPE		**MEAS. EQ.**	**SPEC.**
Any tape		DC Voltmeter	5.35V ± 0.05V

2. Front end (FE)

Servicing work after replacement:

– on the IC 7705: 2.1, 2.2, 2.3, 3.1, 3.2
– on the tuner/modulator: 2.2

2.1 AFC adjustment for PAL (5702)

Purpose: Correct setting for the demodulator AFC circuit

Indications of incorrect setting:
Poor or distorted reception from TV stations.

TP	ADJ.	MODE	INPUT
7705/20	5702	E to E	38.9MHz, 240mV$_{pp}$ at 7702/17; no antenna input
TAPE		**MEAS. EQ.**	**SPEC.**
		DC Voltmeter, Frequ. Generator	2.5V ± 0.2V

2.2 Setting the HF-AGC (3722)

Purpose: To set the "take-over point" on the Hf-AGC

Indications of incorrect setting:
AGC does not synchronise correctly if the input level is too weak. If the level is too high, the picture may be distorted.

The following preparations should be carried out before the setting:

– the device should be at operating temperature

TP	ADJ.	MODE	INPUT
TUMOD Pin 17	AGC-ADJ R3722	E to E	┐┌ 5mV (74dB$_{\mu V}$) PAL white picture, CH27 (519.25), audio IF on, no audio modulation
TAPE		**MEAS. EQ.**	**SPEC.**
		Oscilloscope (10:1 probe) Video Pattern Generator	550mV$_{pp}$ ± 50mV

2.3 AFC adjustment for SECAM Band I (3702)

Purpose: Correct setting of the demodulator AFC circuit

Indications of incorrect setting:
Poor or distorted reception of TV stations.

TP	ADJ.	MODE	INPUT
7705/20	3702	E to E, SECAM L' tuned on preset!	33.9MHz, 240mV$_{pp}$ at 7702/17; no antenna input
TAPE		MEAS. EQ.	SPEC.
		DC Voltmeter, Frequ. Generator	2.5V ± 0.2V

2.4 40.4 MHz suppression (5704)

Purpose: Suppression of residual band I carriers.

Indications of incorrect setting:
Poor picture quality if the filter is suppressing the picture carrier.

TP	ADJ.	MODE	INPUT
1702/1	L5704	E to E	40.4MHz, 240mV$_{pp}$ at Tuner pin 17; no antenna input
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope, Sinus Generator, Counter	minimum

3. Stereo decoder (FM_STEREO)

3.1 Setting the level for the stereo decoder

Servicing work after replacement:
– on IC 7771, 7705: 3.1, 3.2

Purpose: Control the amplification on stereo decoder 7771

Indications of incorrect setting:
Increased noise or overriding of the sound

The following preparations should be carried out before the setting:
– Call up the Service Test program (hold down the "STOP" button on the remote control and the "PLAY" button on the device at the same time for 5s.)

TP	ADJ.	MODE	INPUT
Scart Audio Output (Pin 1)	UP/ DOWN	Service Mode, Step 60	┐┌ Test picture, **Dual Mode** 1kHz, ±27kHz deviation, only on Language II
TAPE		MEAS. EQ.	SPEC.
		AC Millivoltmeter Video Pattern Generator	500mV$_{rms}$ ± 50mV, refer to description below

- Connect the millivoltmeter to Scart 1, pin 1
- Set the amplitude to the required value by pressing the UP (+) or DOWN (-) buttons
- After exiting using SELECT, the value will be stored in the EEPROM.

3.2 Channel separation in the stereo decoder

Purpose: Prevent crosstalk in the sound channels

Indications of incorrect setting:
Crosstalk in the sound channels

The following preparations should be carried out before the setting:

- Call up the Service Test program (hold down the "STOP" button on the remote control and the "PLAY" button on the device at the same time for 5s.)

TP	ADJ.	MODE	INPUT
Scart Audio Output (Pin 3)	UP/ DOWN	Service Mode, Step 61	┐┌ Test picture, 1kHz sound **only** on **right** channel (Stereo Mode)
TAPE		MEAS. EQ.	SPEC.
		AC Millivoltmeter Video Pattern Generator	minimum value, refer to description below

- Connect the millivoltmeter to Scart 1, pin 3
- Set the noise amplitude to the smallest value by pressing the UP (+) or DOWN (-) buttons
- After exiting using SELECT, the value will be stored in the EEPROM.

4. Erase oscillator (ER)

4.1 Erase frequency for the main erase oscillator (5641)

Purpose: Set the correct erase frequency for recording

Indications of incorrect setting:
Erase frequency (or harmonics from it) produces interference in the audible range

TP	ADJ.	MODE	INPUT
1964/1	5641	Record	
TAPE		MEAS. EQ.	SPEC.
Any Tape		Frequency Counter	70kHz ± 10kHz

5. Audio linear (AL)

Servicing work after replacement:
– on IC 7005: 5.1
– on the combo-head: 5.1, 5.2, 5.3

5.1 Audio linear playback level

Purpose: Set the playback level in the audio linear part

Indications of incorrect setting:
The playback is too quiet or overridden

The following preparations should be carried out before the setting:

- Apply a sine-wave of 1kHz; 500 mVeff to Scart 1 (pins 2 and 6)
- SP Record from Scart 1
- Call up the Service Test program
- Play back the recording
- Call up step 62; after calling this up, the linear sound will be present on the output

TP	ADJ.	MODE	INPUT
AV1 (Pin 1 or 3)	UP/ DOWN	Service Mode, Step 62	500mV$_{rms}$ 1kHz
TAPE		MEAS. EQ.	SPEC.
Any Tape		AC Millivoltmeter, Frequency Generator	500mV$_{rms}$ ± 50mV refer to description below

Set the level to the required value using UP / DOWN.
The values set are stored in the EEPROM.

5.2 Erase frequency in the audio erase oscillator (5602)

Purpose: Set the correct erase frequency for 5.2

Indications of incorrect setting:
Erase frequency (or harmonics from it) produces interference in the audible range

TP	ADJ.	MODE	INPUT
9603	5602	Record	
TAPE		MEAS. EQ.	SPEC.
Any Tape		Frequency Counter	70kHz ± 10kHz

5.3 Magnetic biasing current (BIAS, 3626)

Purpose: Set optimal magnetic biasing current.

Indications of incorrect setting:
If the level is too high, the frequency response becomes poor. If the level is too low, the harmonic distortion is increased.

TP	ADJ.	MODE	INPUT
3626, BIAS1/2 (differential measurement)	BIAS R3626	Record	⊤ White picture
TAPE		MEAS. EQ.	SPEC.
Any Tape		Millivoltmeter Video Pattern Generator	7mV$_{rms}$ ± 3mV$_{rms}$

Checking the 'Bias' setting:

After the 'Bias' has been set to the specified value, record some music, play it back, and move the audio switch to the 'MONO' position.
Use cassettes from well-known manufacturers, but not chrome dioxide tapes.
Check that the treble is played back sufficiently well, and that the tone is not distorted. If there is too much treble, the 'Bias' current should be reduced slightly. If the distortion is too great, the 'Bias' current should be increased.

6. FM audio (AF)

Servicing work after replacement:
– on IC 7651: 6.1

6.1 Bargraph level

Purpose: Correct bargraph level displayed for the audio control

Indications of incorrect setting:
Bargraph level is displayed incorrectly depending on the device tolerances.

TP	ADJ.	MODE	INPUT
		Service Mode	AV1 Pin 2 & 6 500mV$_{rms}$, 1kHz
TAPE		MEAS. EQ.	SPEC.
		AC Millivoltmeter, Frequency Generator	Call up Step 63

After calling up step 63, the adjustment is made automatically.
If the adjustment has been carried out successfully, "OK" will appear on the display.
If one of the audio levels measured by the microprocessor is outside the permissible limits, "ERR" will appear.

The values set are stored in the EEPROM.

7. Head amplifier (HA)

Servicing work after replacement:
– on IC 7005 (VS): 7.1

7.1 Setting the PAL chroma write current (3118):

Purpose: Set the optimal chrominance level for recording

Indications of incorrect setting:
If the level is too high, the picture may be distorted.
If the level is too low, the colour may be too weak.

The following preparations should be carried out before the setting:

– Remove the drive
– Connect the emitter and the collector on 7008

TP	ADJ.	MODE	INPUT
R3118 (slider)	R3118	Step 10 of Service Mode; Record	⊤ Red Picture PAL 75% Saturation
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope Video Pattern Generator	420mV$_{pp}$ ± 40 mV$_{pp}$

Disconnect the emitter and collector on 7008.

8. SECAM L chroma processing (VS_SEC)

Servicing work after replacement:

– on IC7066: 8.1

8.1 SECAM chroma write current (3076):

Purpose: Set the optimal chrominance level for recording

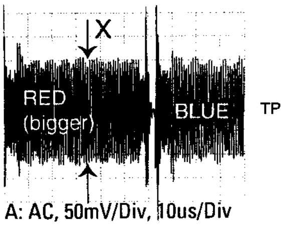
Indications of incorrect setting:
If the level is too high, the picture may be distorted.
If the level is too low, the colour may be too weak.

The following preparations should be carried out before the setting:

– Remove the drive
– Connect the emitter and the collector on 7008

TP	ADJ.	MODE	INPUT
R3076 (slider)	R3076	Step 10 of Service Mode; Record	┐┌ Red Picture SECAM 75% Saturation
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope Video Pattern Generator	$210mV_{pp}$ $\pm 30\ mV_{pp}$

Disconnect the emitter and collector on 7008.



9. Video signal processing (VS)

Servicing work after replacement:
– on IC 7103 (HA), the head disc, the motherboard: 9.1
– on IC 7003, 7005: 10.1

9.1 Studio picture control SPC

Purpose: Set the reference level for the SPC

Indications of incorrect setting:
"Strays" may occur or the picture may be played back with a lower resolution than might be possible

TP	ADJ.	MODE	INPUT
		Service Mode	┐┌ or AV1 black picture, no BURST
TAPE		MEAS. EQ.	SPEC.
SPC Alignment Tape		Video Pattern Generator	Call up Step 52 of Service Mode

The automatic adjustment procedure is started by activating step 52.
If the adjustment has been carried out successfully, "OK" will appear on the display. If the adjustment was incorrect, "ERR" will be displayed.
The values set are stored in the EEPROM.

10. Chroma noise reduction (CNR)

Servicing work after replacement:
– on IC 7003, 7005, 7801, 7804: 10.1

10.1 Amplifying the non-correlation detector (3817)

Purpose: Set the amplification of the 'non-correlation detector'

Indications of incorrect setting:
Poor chroma performance during playback

TP	ADJ.	MODE	INPUT
Collector 7801, 7804	3817	Playback	
TAPE		MEAS. EQ.	SPEC.
Prerecorded Tape		Oscilloscope	adjust to same level

11. Deck electronics (DE)

Servicing work after replacement:
– on the motherboard, the head disc: 11.1, Electro-mechanical adjustments in chapter 4

11.1 Vertical head change-over position

Purpose: Specify the head change-over position during playback.

Indications of incorrect setting:
Errors in head change-over and/or vertical picture flickering.

The following preparations should be carried out before the setting:

– Insert a test cassette with a standard video signal (e.g. 4822 397 30103)
– Call up the Service Test program

TP	ADJ.	MODE	INPUT
		Service Mode	
TAPE		MEAS. EQ.	SPEC.
VHS Alignment Tape			Call up Step 51 of Service Mode

After the adjustment has been made, the device switches to "STOP" mode and displays "OK".

If the adjustment has not been made correctly, the device displays "ERR".
This may be caused by the following:
There is an error in the standard video signal, the scanner is defective or the microprocessor is defective

The values set are stored in the EEPROM.

12. Display control (DC)

Servicing work after replacement:
– on clock quartz: 12.1

12.1 Clock frequency

Purpose: Set the precise clock frequency

Indications of incorrect setting:
The clock loses or gains time

The following preparations should be carried out before the setting:

- Call up the Service Test program, select step 99
  After calling this up using Select, the display is switched to dark and it is not possible to operate any functions on the device.
- Measure and note down the frequency on pin 13 from connector plug 1944 to 7 digits (should be approx. 2048 Hz)
- Exit step 99 by resetting the power supply

TP	ADJ.	MODE	INPUT
1900/2		Service Mode, Step 53	

TAPE	MEAS. EQ.	SPEC.
	Frequency counter with 7 digits	refer to description below

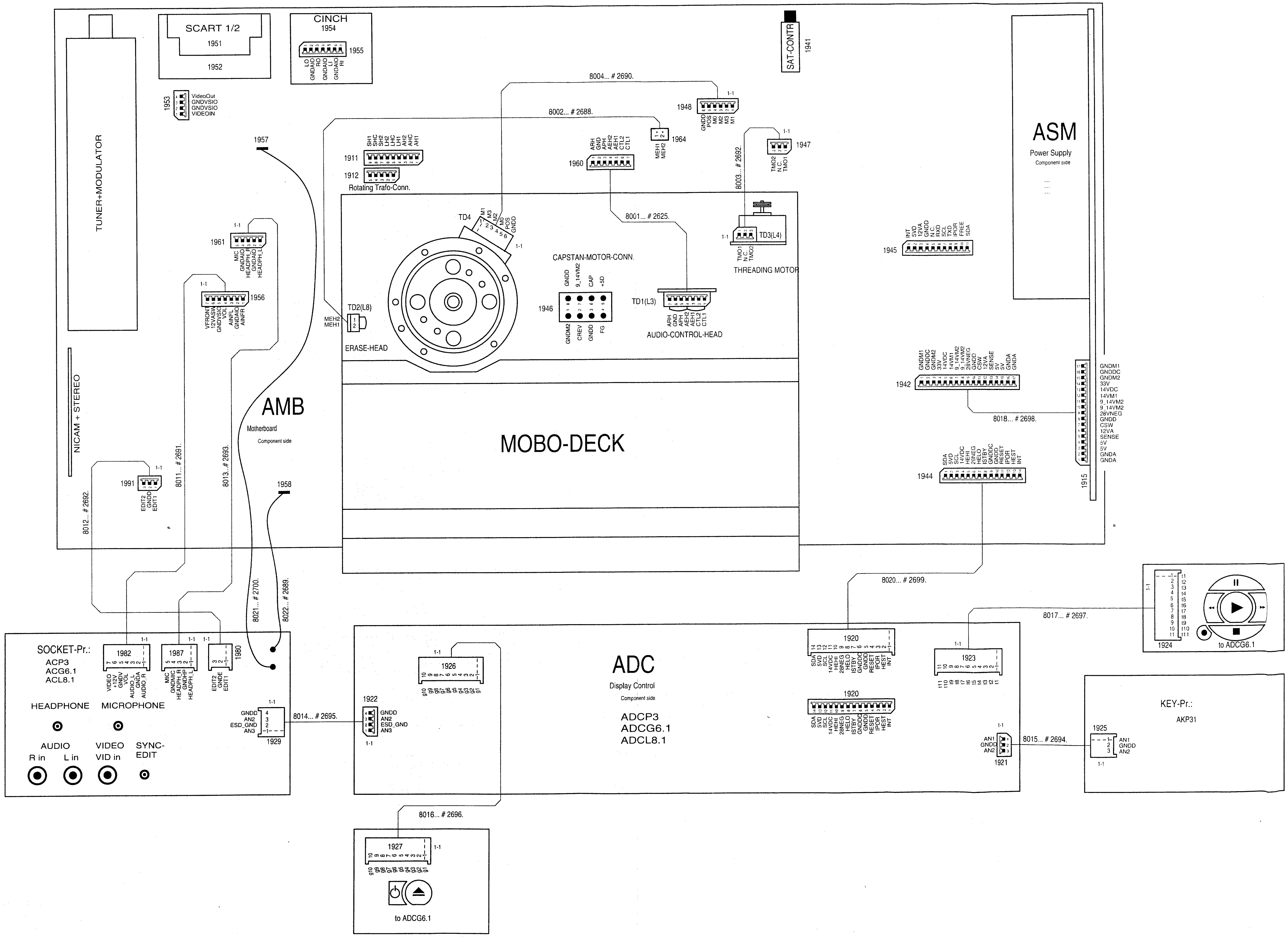
- Call up step 53 of the Service Test program;
  the display should show '--:--:53'
- by the help of the remote, type in the last 4 digits of the measured frequency
  e.g. measured frequency =2048.123 - input 81:23
- Press the 'OK' button;

The microprocessor calculates a correction factor for the clock frequency from the value entered.
If the frequency entered is outside certain limits, 'ERR' will be shown on the display.

List of Signal Abbreviations

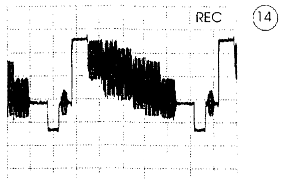
2FSC	2x Colour subcarrier
10SC12	Scart 1/2 Pin 10
8SC1	Scart 1 pin 8 input
8SC1H	Scart 1 pin 8 high level
8SC1M	Scart 1 pin 8 medium level
8SC2	Scart 2 pin 8 input
9_14VM2	Capstan motor supply, switched
A0-19	Adress lines
AEH1/2	Audio erase head
AF1	Audio from frontend, left
AF2	Audio from frontend, right
AFC	Automatic frequency control
AFE	Audio from frontend
AGC	Automatic gain control
AH1/2/C	Audio heads
AIN1L	Audio input scart 1, left
AIN1R	Audio input scart 1, right
AIN2L	Audio input scart 2, left
AIN2R	Audio input scart 2, right
AINBL	Audio left from cinch connector
AINBR	Audio right from cinch connector
AINFL	Audio left from Front connector
AINFR	Audio right from front connector
AMCO	Audio mono to the modulator
AMLP	Audio mono playback
AMLR	Audio mono record
AN1/2	Analog voltage from keyboard matrix
ANIL	NICAM Audio, left
ANIR	NICAM Audio, right
AOUT1L	Audio output from scart 1, left
AOUT1R	Audio output from scart 1, right
AOUT2L	Audio output from scart 2, left
AOUT2R	Audio output from scart 2, right
APH	Audio playback head
ARH	Audio record head
CAGC	Chroma Automatic gain control
CAP	Capstan regulation voltage
CKDET	Colour killer detection
CNR	Chroma Noise Reduction
CPRV	Chrominance PAL record
CREV	Capstan reverse
CROT	Colour rotation
CS0	Chip Select 0
CS1	Chip Select 1
CSCP	Colour phase switching for LP feature mode
CSI	Colour system information
CSP	Chrominance secam playback
CSPO	Chroma to Noise Reduction
CSRV	Chrominance secam record
CSW	9V/17V switching for capstan motor
CSYNC/1/2	Composite sync pulse
CTL1/2	Control track signal
D0-7	Data lines
DC_RESET	Reset Display Control
DRUM	Head wheel control
EDIT1/2	Synchro-Edit control signal
ENVC	Envelope comparator signal
FFP	Feature frame pulse
FGD	Capstan tacho pulse digital
FM1	L+R
FM2	2R
FMAP	FM audio playback
FMAR	FM audio record
FMPV	FM video playback
FMRV	FM video record
FOME	Follow Me (video signals equal)
FSC	Colour subcarrier
FTA	Threading tacho
FTAD	Threading tacho digital
HEHI	Heater for displaytube high
HELO	Heater for displaytube low
HEST	Heater voltage control signal
HP1	Head pulse video
HP2	Head pulse audio
HSC	Head Select Control (SP/LP)
IMEO	Main erase oscillator on/off
INIT	Deck switch
INT	Interrupt
IPOR	Inverse power on reset
IRAF	Inverse record FM-audio
IRAL	Inverse Record Audio Linear
IREV	Inverse Record Video
ISTBY	Inverse stand by
ISWS	Crosstalk Reduction
IWIND	Control pulse amplification low
LH1/2/C	Long play heads
MEH1/2	Main erase head
MON	Loop through pin 16 scart 2/1
MTA	Audio mute
NC	Not connected
ODAT	Shift register bus data
OFP	OSD Frame pulse
PBV	Playback Video
PG_FG	Head wheel position/-speed
PIN10_IN	Pin 10 scart 1/2 output
PIN10_OUT	Pin 10 scart 1/2 input
POR	Power on reset
PSS	PAL/SECAM Switch
RD	Output Enable RAM/ROM
RECP	Record protection
RxD	Receive Data
SB1	Secam band 1
SCL	IIC bus clock
SDA	IIC bus data
SCL2	YCA IIC bus clock
SDA2	YCA IIC bus data
SCL3	High Speed IIC bus clock
SDA3	High Speed IIC bus data
SFS	Sound filter switch
SH1/2/C	Standard play heads
SRCLK	Shift Register Clock
SSIF	Second sound intermediate frequency
STROBE	Strobe pulse for shiftregister
SWIN	Head switching pulse
SYNC	Control track pulse
TAE	Tape end detection
TAS	Tape start detection
THIO	Threading motor in/out
TMO	Loading motor on/off
TRIA_ALM	Tracking information audio / Audio level indication
TRIV	Tracking information video
TxD	Transmit Data
VBS	Video to signal electronics
VCCD1	Signal before Y-CCD
VCCD2	Signal after Y-CCD
VFRONT	Video from front connector
VFV	Video from front end
VIDOUT1	Video output scart 1
VIDOUT2	Video output scart 2
VIDEOIN1	Video input scart 1
VIDEOIN2	Video input scart 2
VISS	Control sync pulse inversion
VOL	headphone volume
VOUT	Video from OSD part
VSB	Video from signal electronics
W_R	Control track write/read
WR	Write enable for RAM
WTL	Wind tacho left
WTLD	Wind tacho left digital
WTR	Wind tacho right
WTRD	Wind tacho right digital

Wiring Diagram

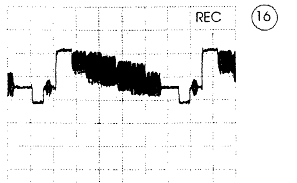

TUNER+MODULATOR
SCART 1/2
1951
1952
CINCH
1954
1955
LO GNDAIO RO GNDAIO LI GNDAIO RI
1953
VideoOut
GNDVSIO
GNDVSIO
VIDEOIN
SAT-CONTR
1941
ASM
Power Supply
Component side
8004... # 2690.
8002... # 2688.
1948
GNDD POS M0 M2 M3 M1
1964
MEH1 MEH2
1947
TMO2 N.C. TMO1
1957
1911
1912
Rotating Trafo-Conn.
SH1 SHC SH2 LH2 LHC LH1 AH2 AHC AH1
1960
ARH GND APH AEH2 AEH1 CTL2 CTL1
8003... # 2692.
8001... # 2625.
TD4
M1 M3 M2 M0 POS GNDD
1961
MIC GNDAIO HEADPH_R GNDAIO HEADPH_L
1956
VFRONT 12VASW GNDVSIO VOL AINFL GNDAIO AINFR
CAPSTAN-MOTOR-CONN.
1946
GNDD 9_14VM2 CAP +5D
GNDM2 CREV GNDD FG
TD2(L8)
MEH2 MEH1
ERASE-HEAD
TD1(L3)
AUDIO-CONTROL-HEAD
TD3(L4)
TMO1 N.C. TMO2
THREADING MOTOR
1945
INT 5VD 12VA GNDD N.C. RXD SCL TXD IPOR FREE SDA
1942
GNDM1 GNDDC GNDM2 33V 14VDC 14VM1 9_14VM2 9_14VM2 28VNEG GNDD CSW 12VA SENSE 5V 5V GNDA GNDA
8018... # 2698.
1915
1944
SDA 5VD SCL 14VDC HEHI 28NEG HELO ISTBY GNDDC GNDD RESET IPOR HEST INT
NICAM + STEREO
AMB
Motherboard
Component side
MOBO-DECK
1991
EDIT2 GNDD EDIT1
8012... # 2692.
8011... # 2691.
8013... # 2693.
1958
8021... # 2700.
8022... # 2689.
8020... # 2699.
8017... # 2697.
SOCKET-Pr.:
ACP3
ACG6.1
ACL8.1
1982
VIDEO +12V GNDV VOL AUDIO_L GNDA AUDIO_R
1987
MIC GNDMIC HEADPH_R GNDHP HEADPH_L
1980
EDIT2 GNDE EDIT1
HEADPHONE
MICROPHONE
AUDIO
R in
L in
VIDEO
VID in
SYNC-EDIT
1929
GNDD AN2 ESD_GND AN3
8014... # 2695.
1922
GNDD AN2 ESD_GND AN3
1926
g10 g9 g8 g7 g6 g5 g4 g3 g2 g1
ADC
Display Control
Component side
ADCP3
ADCG6.1
ADCL8.1
1920
SDA 5VD SCL 14VDC HEHI 28NEG HELO ISTBY GNDDC GNDD RESET IPOR HEST INT
1923
t11 t10 t9 t8 t7 t6 t5 t4 t3 t2 t1
1924
to ADCG6.1
1921
AN1 GNDD AN2
8015... # 2694.
KEY-Pr.:
AKP31
1925
AN1 GNDD AN2
8016... # 2696.
1927
to ADCG6.1
1-1

S 93913

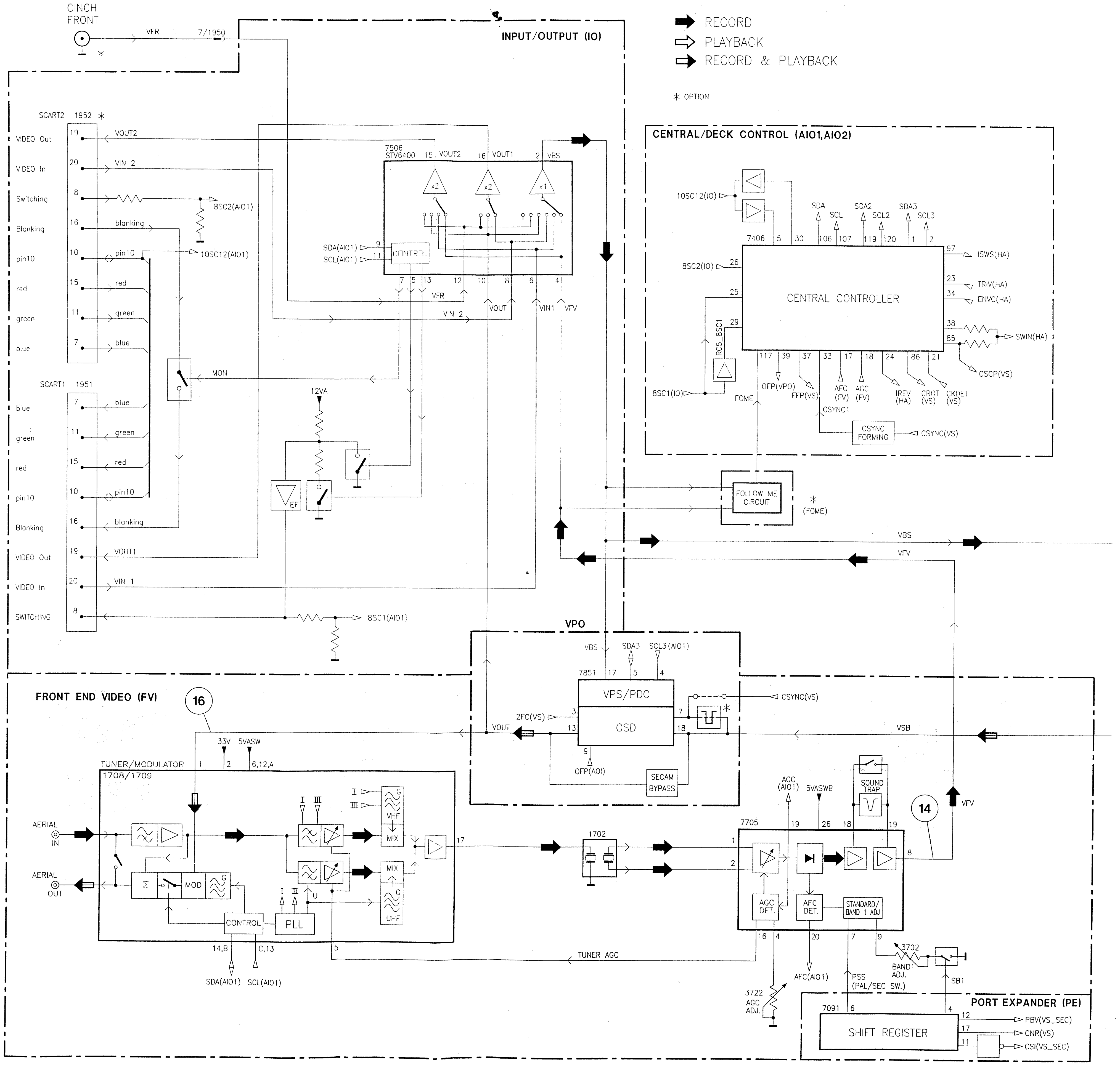
Block Diagram Video



A: DC, 500mV/Div. 10us/Div
IC 7705 Pin 8

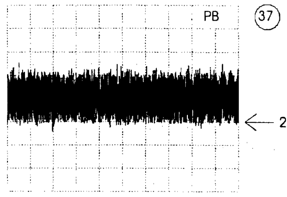


A: DC, 500mV/Div. 10us/Div
Tumod Pin 1

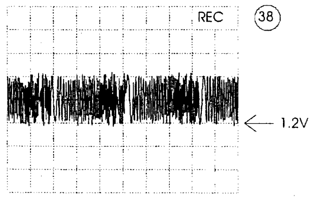


RECORD
PLAYBACK
RECORD & PLAYBACK
* OPTION
CINCH FRONT
VFR
7/1950
INPUT/OUTPUT (IO)
SCART2 1952 *
VIDEO Out
VIDEO In
Switching
Blanking
pin10
red
green
blue
VOUT2
VIN 2
8SC2(AIO1)
blanking
10SC12(AIO1)
SCART1 1951
VOUT1
VIN 1
SWITCHING
8SC1(AIO1)
MON
7506
STV6400
VOUT2
VOUT1
VBS
x2
x2
x1
SDA(AIO1)
SCL(AIO1)
CONTROL
VOUT
VIN1
VFV
12VA
EF
CENTRAL/DECK CONTROL (AIO1,AIO2)
10SC12(IO)
8SC2(IO)
8SC1(IO)
RC5_8SC1
7406
CENTRAL CONTROLLER
SDA
SCL
SDA2
SCL2
SDA3
SCL3
ISWS(HA)
TRIV(HA)
ENVC(HA)
SWIN(HA)
CSCP(VS)
OFP(VPO)
FFP(VS)
AFC (FV)
AGC (FV)
IREV (HA)
CRCT (VS)
CKDET (VS)
FOME
CSYNC1
CSYNC FORMING
CSYNC(VS)
FOLLOW ME CIRCUIT
* (FOME)
VBS
VFV
VPO
SDA3
SCL3 (AIO1)
7851
VPS/PDC
OSD
2FC(VS)
VOUT
OFP(AIO)
SECAM BYPASS
CSYNC(VS)
VSB
FRONT END VIDEO (FV)
⑯
33V
5VASW
TUNER/MODULATOR
1708/1709
AERIAL IN
AERIAL OUT
Σ
MOD
VHF
UHF
MIX
CONTROL
PLL
14,B
C,13
SDA(AIO1)
SCL(AIO1)
TUNER AGC
1702
AGC (AIO1)
5VASWB
SOUND TRAP
7705
AGC DET.
AFC DET.
STANDARD/ BAND 1 ADJ
⑭
VFV
3702
BAND1 ADJ.
SB1
3722
AGC ADJ.
AFC(AIO1)
PSS (PAL/SEC SW.)
PORT EXPANDER (PE)
7091
SHIFT REGISTER
PBV(VS_SEC)
CNR(VS)
CSI(VS_SEC)

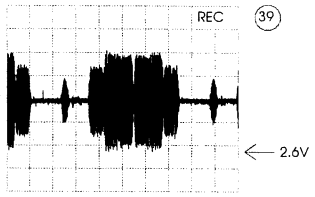
Block Diagram Video



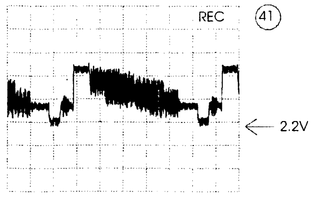
A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



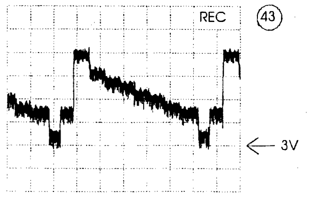
A: AC, 200mV/Div, 20us/Div
FMRV



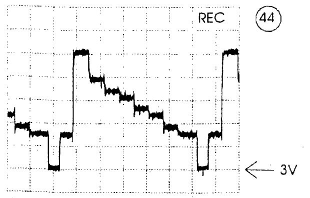
A: AC, 100mV/Div, 10us/Div
CPRV



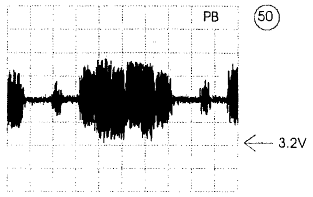
A: AC, 500mV/Div, 10us/Div
IC 7005 Pin 35



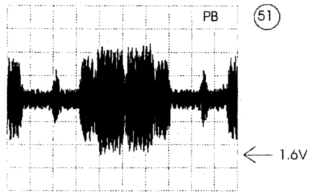
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 40



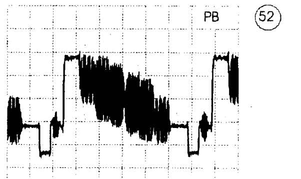
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 26



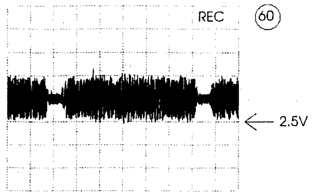
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 52



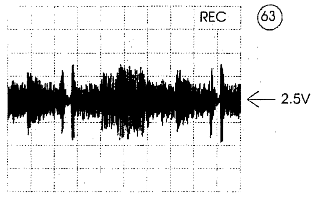
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 45



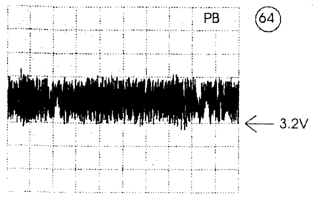
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 35



A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 29



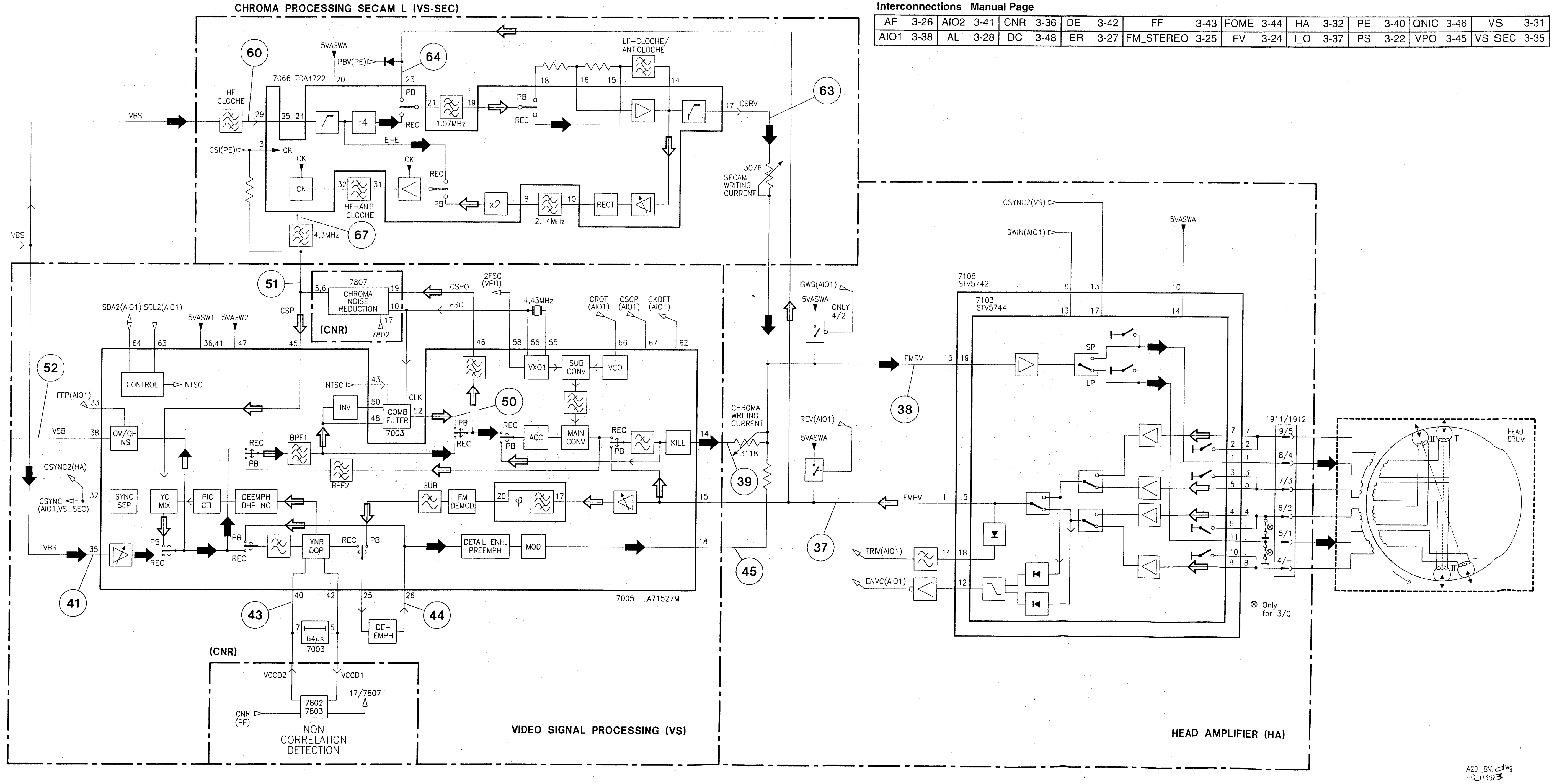
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 17



A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 23

Interconnections Manual Page

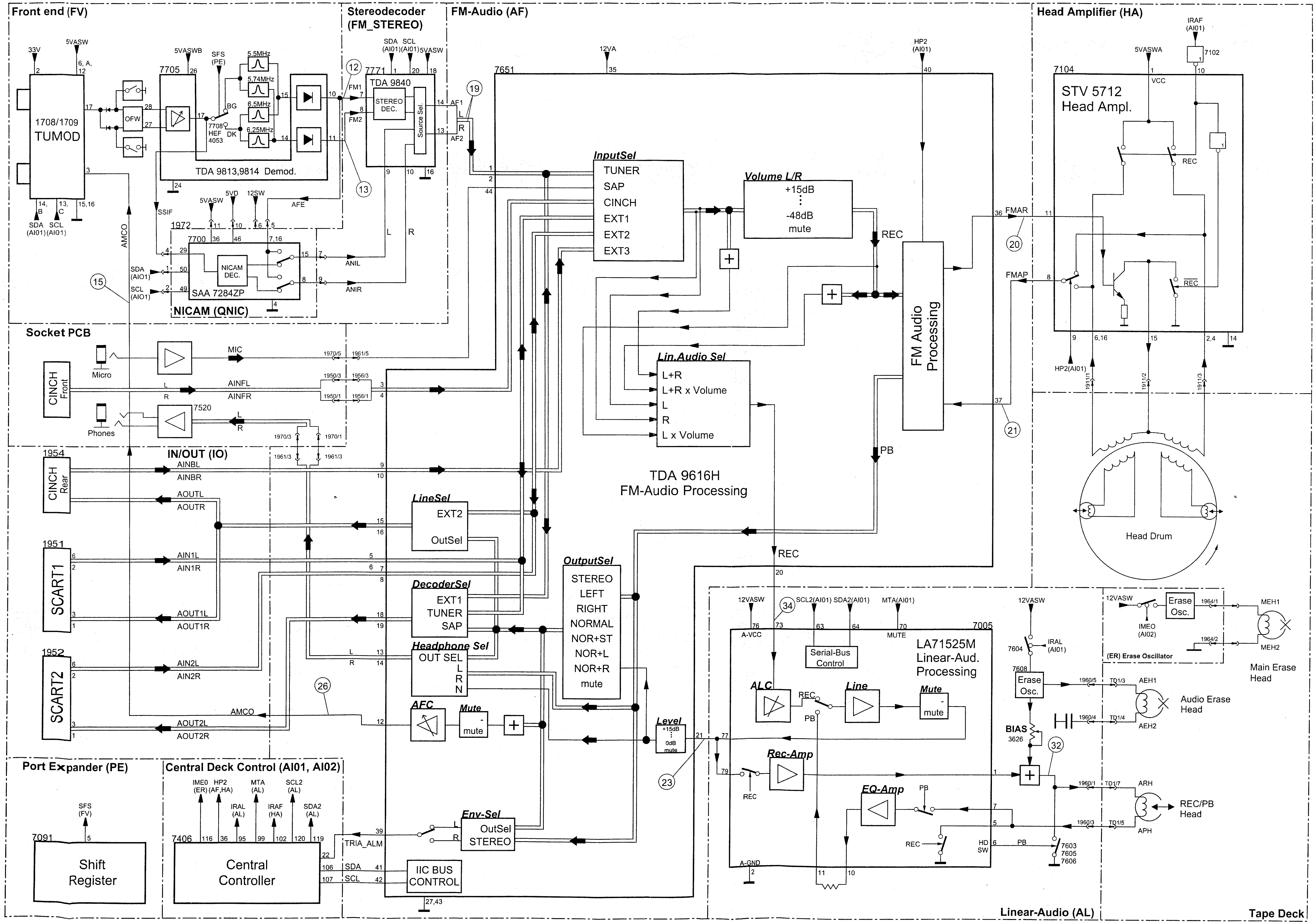
AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35


CHROMA PROCESSING SECAM L (VS-SEC)
VBS
HF CLOCHE
5VASWA
PBV(PE)
7066 TDA4722
CSI(PE)
CK
:4
E-E
REC
PB
1.07MHz
LF-CLOCHE/ ANTICLOCHE
CSRV
3076
SECAM WRITING CURRENT
HF-ANTI CLOCHE
x2
2.14MHz
RECT
4,3MHz
(60)
(64)
(63)
(67)
(51)
7807
CHROMA NOISE REDUCTION
(CNR)
7802
CSPO
FSC
2FSC (VPO)
4,43MHz
CROT (AIO1)
CSCP (AIO1)
CKDET (AIO1)
SDA2(AIO1) SCL2(AIO1)
5VASW1 5VASW2
CSP
CONTROL
NTSC
(52)
FFP(AIO1)
VSB
QV/QH INS
CSYNC2(HA)
CSYNC (AIO1,VS_SEC)
SYNC SEP
YC MIX
PIC CTL
DEEMPH DHP NC
INV
COMB FILTER
7003
BPF1
BPF2
VXO1
SUB CONV
VCO
ACC
MAIN CONV
KILL
(50)
SUB
FM DEMOD
φ
YNR DOP
DETAIL ENH. PREEMPH
MOD
7005 LA71527M
(41)
(43)
(44)
DE-EMPH
64μs
7003
(CNR)
VCCD2
VCCD1
7802 7803
17/7807
CNR (PE)
NON CORRELATION DETECTION
VIDEO SIGNAL PROCESSING (VS)
CHROMA WRITING CURRENT
3118
(39)
(45)
(37)
(38)
ISWS(AIO1)
5VASWA
ONLY 4/2
IREV(AIO1)
FMRV
FMPV
TRIV(AIO1)
ENVC(AIO1)
CSYNC2(VS)
SWIN(AIO1)
7108 STV5742
7103 STV5744
SP
LP
1911/1912
9/5
8/4
7/3
6/2
5/1
4/-
Only for 3/0
HEAD DRUM
HEAD AMPLIFIER (HA)

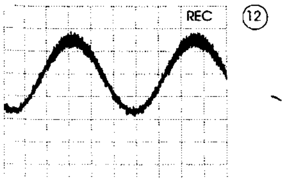
A20_BV.dwg
HC_0398

PCS 93915

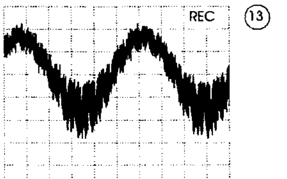
Block Diagram Audio


Front end (FV)
Stereodecoder (FM_STEREO)
FM-Audio (AF)
Head Amplifier (HA)
33V
5VASW
6, A, 12
1708/1709
TUMOD
14, B
13, C
15,16
SDA (AI01)
SCL (AI01)
5VASWB
SFS (PE)
7705
OFW
5,5MHz
5,74MHz
6,5MHz
6,25MHz
BG
DK
7708
HEF 4053
TDA 9813,9814 Demod.
24
SSIF
AMCO
SDA SCL (AI01)(AI01)
5VASW
7771
TDA 9840
STEREO DEC.
Source Sel.
FM1
FM2
AF1
AF2
1972
7700
NICAM DEC.
SAA 7284ZP
NICAM (QNIC)
5VD
12SW
AFE
ANIL
ANIR
12VA
7651
HP2 (AI01)
InputSel
TUNER
SAP
CINCH
EXT1
EXT2
EXT3
Volume L/R
+15dB
-48dB
mute
REC
FM Audio Processing
Lin.Audio Sel
L+R
L+R x Volume
L
R
L x Volume
PB
TDA 9616H
FM-Audio Processing
FMAR
FMAP
IRAF (AI01)
7102
5VASWA
7104
VCC
STV 5712
Head Ampl.
REC
HP2(AI01)
1911/1
1911/2
1911/3
Head Drum
Socket PCB
Micro
MIC
CINCH Front
AINFL
AINFR
7520
Phones
1970/5
1961/5
1950/3
1956/3
1950/1
1956/1
1970/3
1970/1
1961/3
IN/OUT (IO)
1954
CINCH Rear
AINBL
AINBR
AOUTL
AOUTR
1951
SCART1
AIN1L
AIN1R
AOUT1L
AOUT1R
1952
SCART2
AIN2L
AIN2R
AMCO
AOUT2L
AOUT2R
LineSel
EXT2
OutSel
DecoderSel
EXT1
TUNER
SAP
Headphone Sel
OUT SEL
L
R
N
AFC
Mute
mute
OutputSel
STEREO
LEFT
RIGHT
NORMAL
NOR+ST
NOR+L
NOR+R
mute
Level
+15dB
0dB
mute
Env-Sel
OutSel
STEREO
TRIA_ALM
IIC BUS CONTROL
SDA
SCL
27,43
Port Expander (PE)
SFS (FV)
7091
Shift Register
Central Deck Control (AI01, AI02)
IMEO (ER)
HP2 (AF,HA)
IRAL (AL)
MTA (AL)
IRAF (HA)
SCL2 (AL)
SDA2 (AL)
7406
Central Controller
12VASW
SCL2(AI01) SDA2(AI01)
MTA(AI01)
A-VCC
MUTE
7005
Serial-Bus Control
LA71525M
Linear-Aud. Processing
ALC
Line
Mute
mute
Rec-Amp
EQ-Amp
PB
REC
A-GND
HD SW
7604
IRAL (AI01)
7608
Erase Osc.
BIAS
3626
1960/5
1960/4
1960/1
1960/3
TD1/3
TD1/4
TD1/7
TD1/5
AEH1
AEH2
Audio Erase Head
ARH
APH
REC/PB Head
7603
7605
7606
IMEO (AI02)
1964/1
1964/2
MEH1
MEH2
(ER) Erase Oscillator
Main Erase Head
Linear-Audio (AL)
Tape Deck
⑫
⑬
⑮
⑲
⑳
㉑
㉓
㉖
㉜
㉞

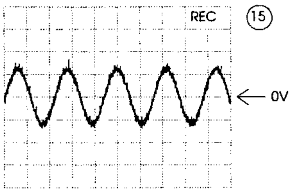
Oscillograms Block Diagram Audio



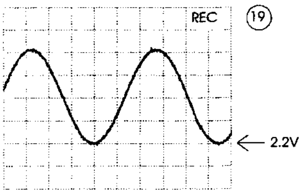
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 10



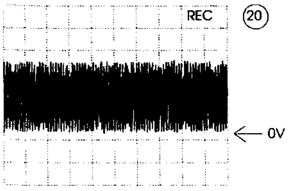
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 11



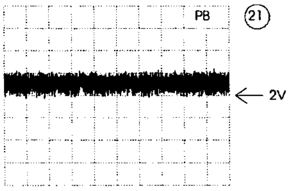
A: DC, 500mV/Div, 500us/Div
Tumod Pin 3



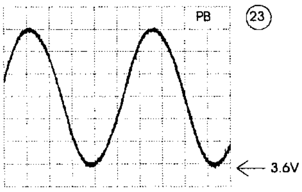
A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 13/14



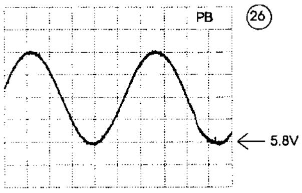
A: DC, 200mV/Div, 5ms/Div
FMAR



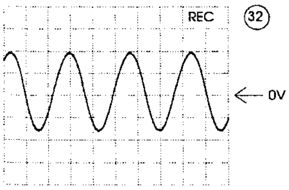
A: AC, 200mV/Div, 500us/Div
FMAP



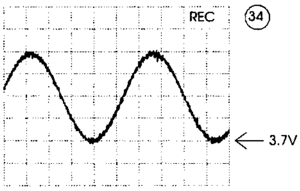
A: AC, 100mV/Div, 200us/Div
IC 7651 Pin 21



A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 18/19



A: DC, 20 V/Div, 5us/Div
Connector 1960 Pin 1

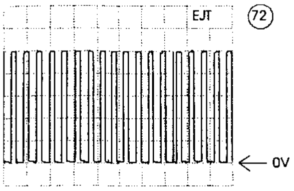


A: AC, 50mV/Div, 200us/Div
IC 7005 Pin 73

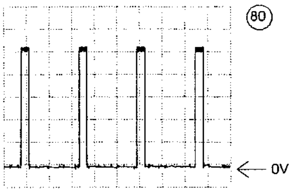
Interconnections Manual Page

AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35

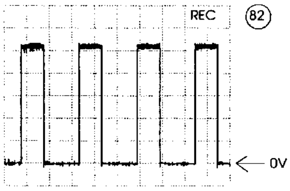
Oscillograms Block Diagram Digital



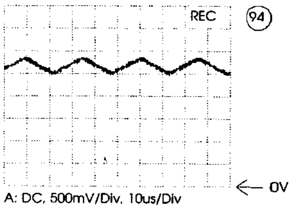
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



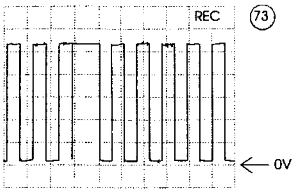
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 89



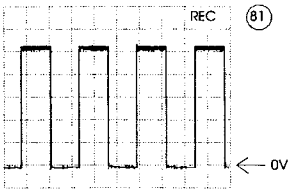
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 87



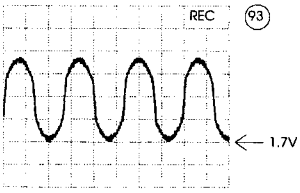
A: DC, 500mV/Div, 10us/Div
Connector 1946 Pin 6



A: DC, 1 V/Div, 2ms/Div
IC 7406 Pin 28



A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 88

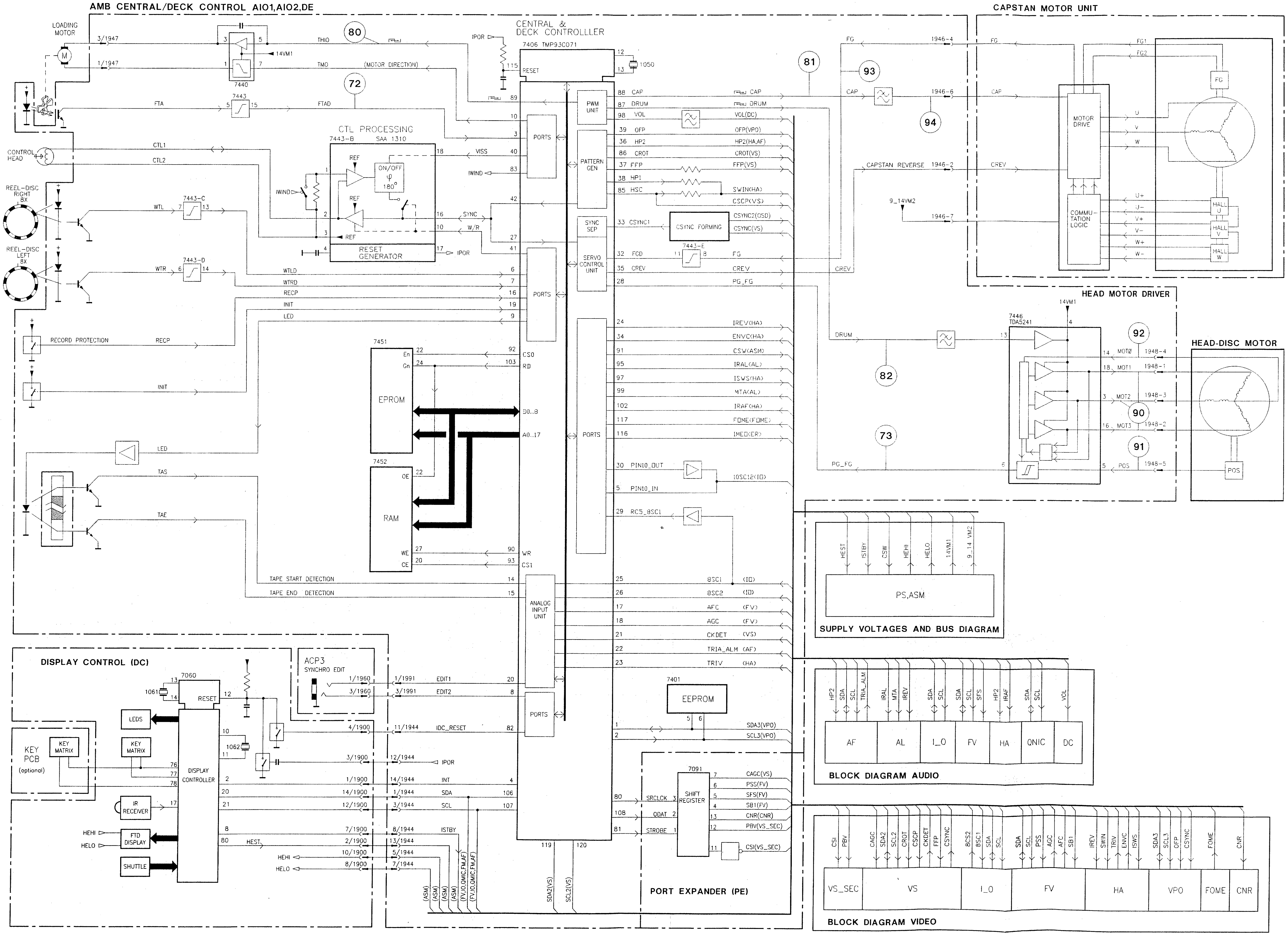


A: DC, 500mV/Div, 500us/Div
Connector 1946 Pin 4

Interconnections Manual Page

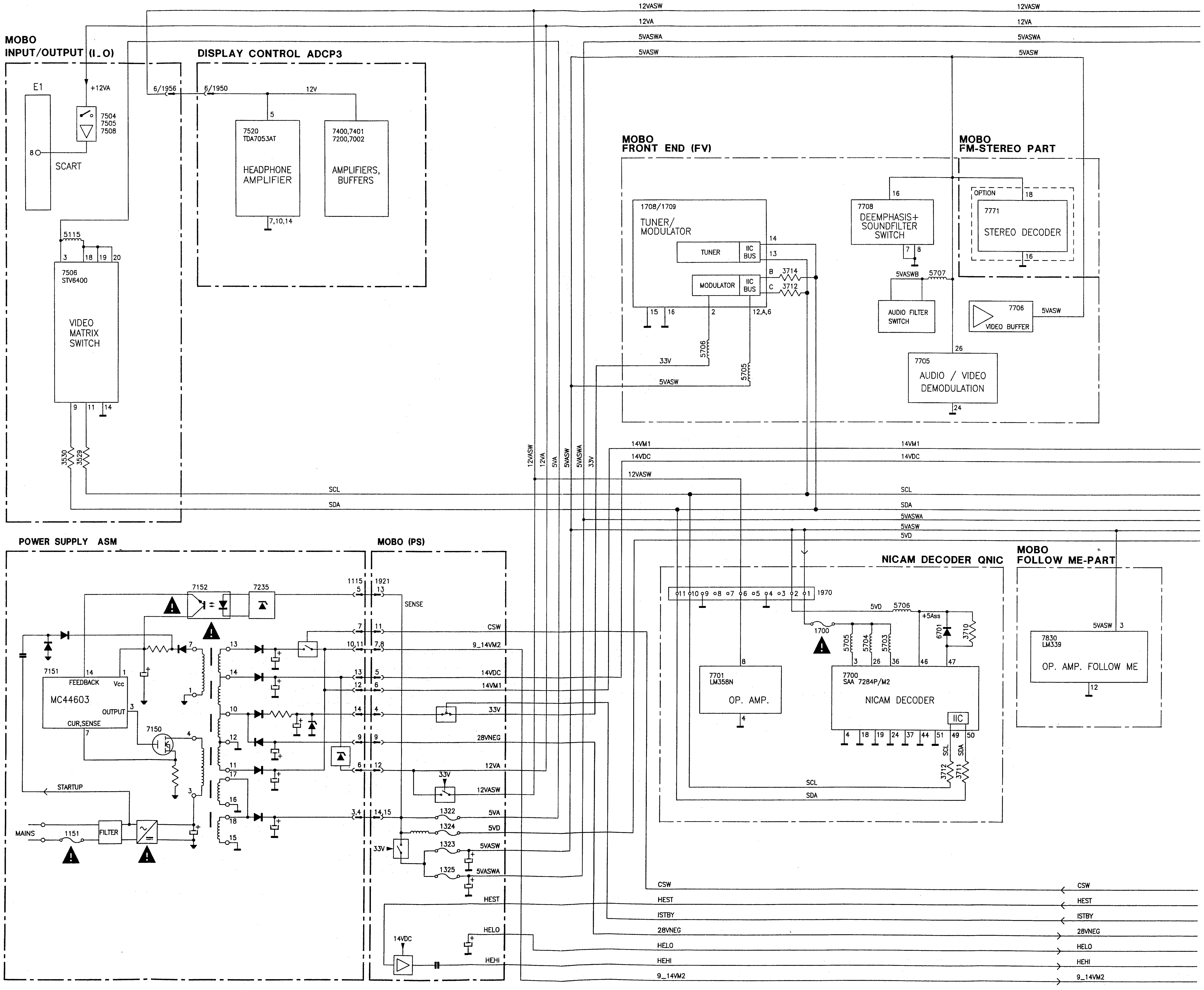
AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35

Block Diagram Digital


AMB CENTRAL/DECK CONTROL AIO1,AIO2,DE
LOADING MOTOR
M
3/1947
1/1947
THIO
TMO
(MOTOR DIRECTION)
14VM1
7440
7443
FTA
FTAD
80
72
CTL PROCESSING
7443-B SAA 1310
REF
ON/OFF
φ
180°
IWIND
RESET GENERATOR
IPOR
VISS
SYNC
W/R
CONTROL HEAD
CTL1
CTL2
REEL-DISC RIGHT 8X
REEL-DISC LEFT 8X
7443-C
7443-D
WTL
WTR
WTLD
WTRD
RECP
INIT
LED
RECORD PROTECTION
TAS
TAE
TAPE START DETECTION
TAPE END DETECTION
CENTRAL & DECK CONTROLLLER
7406 TMP93C071
RESET
1050
PWM UNIT
PATTERN GEN
SYNC SEP
SERVO CONTROL UNIT
PORTS
ANALOG INPUT UNIT
CAP
DRUM
VOL
VOL(DC)
OFP
OFP(VPO)
HP2
HP2(HA,AF)
CROT
CROT(VS)
FFP
FFP(VS)
HP1
HSC
SWIN(HA)
CSCP(VS)
CSYNC1
CSYNC FORMING
CSYNC2(OSD)
CSYNC(VS)
FCD
7443-E
FG
CREV
PG_FG
IREV(HA)
ENVC(HA)
CSW(ASM)
IRAL(AL)
ISWS(HA)
MTA(AL)
IRAF(HA)
FOME(FOME)
IMED(CR)
PIN10_OUT
PIN10_IN
IOSC12(IO)
RC5_8SC1
8SC1 (IO)
8SC2 (IO)
AFC (FV)
AGC (FV)
CKDET (VS)
TRIA_ALM (AF)
TRIV (HA)
7451
EPROM
D0...8
A0...17
7452
RAM
CS0
RD
WR
CS1
7401
EEPROM
SDA3(VPO)
SCL3(VPO)
81
93
94
82
73
92
90
91
CAPSTAN REVERSE
9_14VM2
1946-4
1946-6
1946-2
1946-7
CAPSTAN MOTOR UNIT
FG1
FG2
MOTOR DRIVE
COMMU-TATION LOGIC
U
V
W
U+
U-
V+
V-
W+
W-
HALL U
HALL V
HALL W
HEAD MOTOR DRIVER
14VM1
7446 TDA5241
MOT0
MOT1
MOT2
MOT3
POS
1948-4
1948-1
1948-3
1948-2
1948-5
HEAD-DISC MOTOR
DISPLAY CONTROL (DC)
7060
1061
1062
LEDS
KEY PCB (optional)
KEY MATRIX
IR RECEIVER
FTD DISPLAY
SHUTTLE
HEHI
HELO
DISPLAY CONTROLLER
HEST
ACP3 SYNCHRO EDIT
1/1960
3/1960
1/1991
3/1991
EDIT1
EDIT2
4/1900
11/1944
IDC_RESET
3/1900
12/1944
IPOR
1/1900
14/1944
INT
14/1900
1/1944
SDA
12/1900
3/1944
SCL
7/1900
8/1944
ISTBY
2/1900
13/1944
10/1900
5/1944
8/1900
7/1944
(ASM)
(FV,IO,QMIC,FM,AF)
SDA2(VS)
SCL2(VS)
PORT EXPANDER (PE)
7091
SHIFT REGISTER
SRCLCK
QDAT
STROBE
CAGC(VS)
PSS(FV)
SFS(FV)
SB1(FV)
CNR(CNR)
PBV(VS_SEC)
CSI(VS_SEC)
SUPPLY VOLTAGES AND BUS DIAGRAM
PS,ASM
HEST
ISTBY
CSW
HEHI
HELO
14VM1
9_14 VM2
BLOCK DIAGRAM AUDIO
AF
AL
I_O
FV
HA
QNIC
DC
BLOCK DIAGRAM VIDEO
VS_SEC
VS
I_O
FV
HA
VPO
FOME
CNR

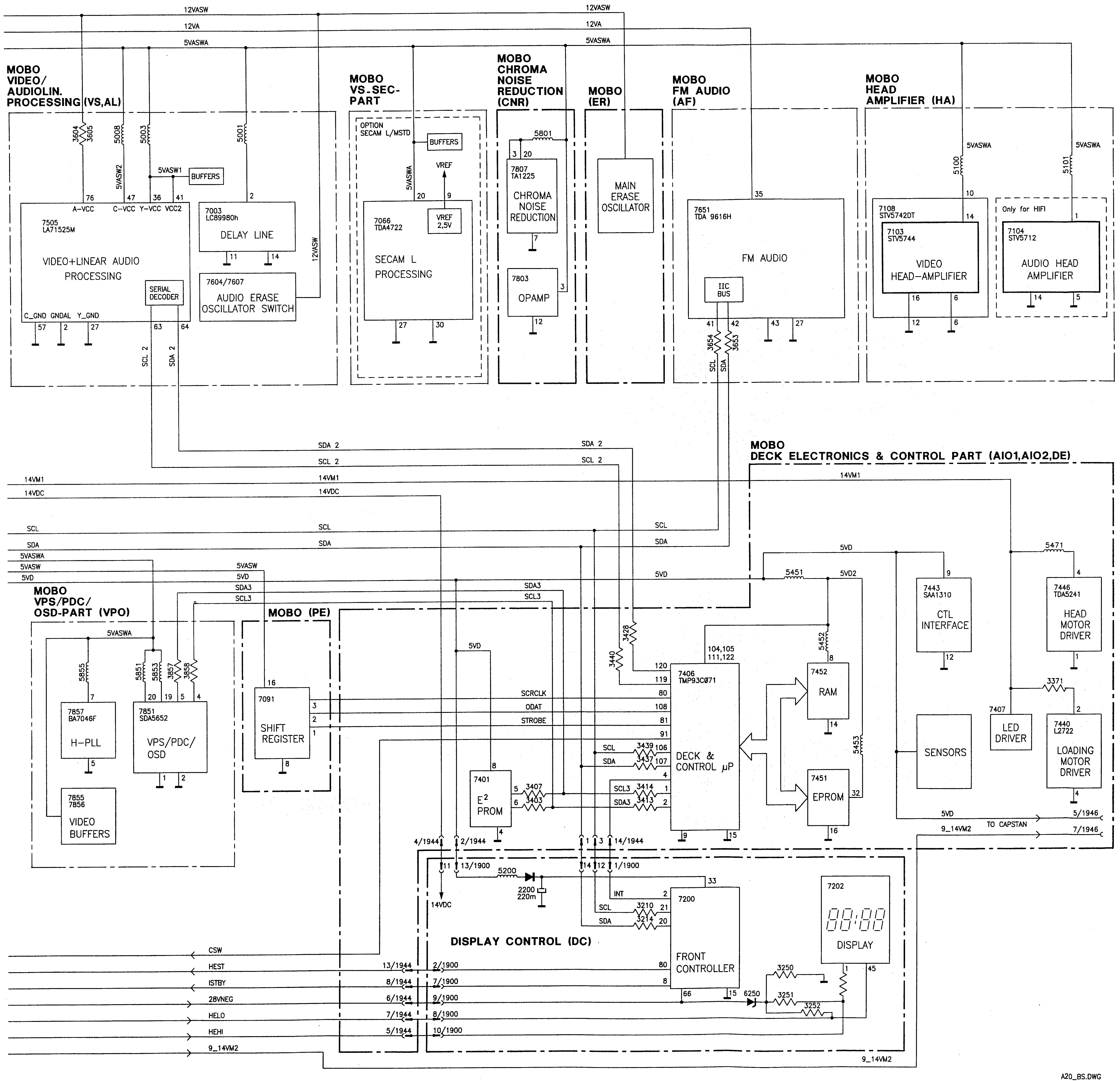
A20_BD.DWG
HG_0398

Block Diagram Supply & I^{2}C


12VASW
12VA
5VASWA
5VASW
MOBO
INPUT/OUTPUT (I_O)
E1
+12VA
7504
7505
7508
8
SCART
6/1956
DISPLAY CONTROL ADCP3
6/1950
12V
5
7520
TDA7053AT
HEADPHONE AMPLIFIER
7,10,14
7400,7401
7200,7002
AMPLIFIERS, BUFFERS
5115
3
18
19
20
7506
STV6400
VIDEO MATRIX SWITCH
9
11
14
3530
3529
SCL
SDA
MOBO
FRONT END (FV)
1708/1709
TUNER/ MODULATOR
TUNER
IIC BUS
MODULATOR
14
13
B
C
3714
3712
15
16
2
12,A,6
5706
5705
33V
5VASW
MOBO
FM-STEREO PART
7708
DEEMPHASIS+ SOUNDFILTER SWITCH
16
7
8
5VASWB
5707
AUDIO FILTER SWITCH
OPTION
18
7771
STEREO DECODER
7706
VIDEO BUFFER
26
7705
AUDIO / VIDEO DEMODULATION
24
14VM1
14VDC
12VASW
SCL
SDA
5VASWA
5VASW
5VD
12VASW
12VA
5VA
5VASW
5VASWA
33V
POWER SUPPLY ASM
MOBO (PS)
7152
7235
1115
1921
SENSE
7151
MC44603
FEEDBACK
Vcc
OUTPUT
CUR.SENSE
14
1
3
7
7150
STARTUP
MAINS
1151
FILTER
CSW
9_14VM2
14VDC
14VM1
33V
28VNEG
12VA
12VASW
5VA
5VD
5VASW
5VASWA
HEST
HELO
HEHI
14VDC
1322
1324
1323
1325
33V
NICAM DECODER QNIC
1970
5VD
5706
+5Ass
1700
5705
5704
5703
6701
3710
7701
LM358N
OP. AMP.
8
4
7700
SAA 7284P/M2
NICAM DECODER
IIC
3
26
36
46
47
4
18
19
24
37
44
51
49
50
SCL
SDA
3712
3711
MOBO
FOLLOW ME-PART
5VASW
7830
LM339
OP. AMP. FOLLOW ME
12
CSW
HEST
ISTBY
28VNEG
HELO
HEHI
9_14VM2

MOBO ... MOTHERBOARD

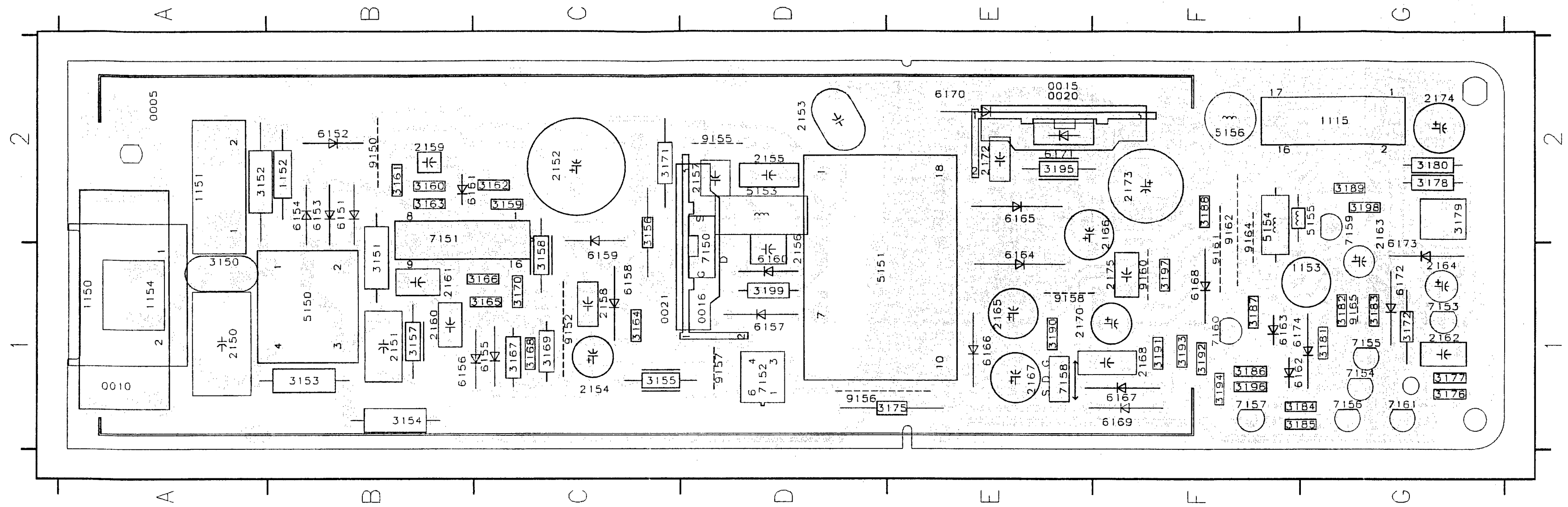
Block Diagram Supply & I^{2}C

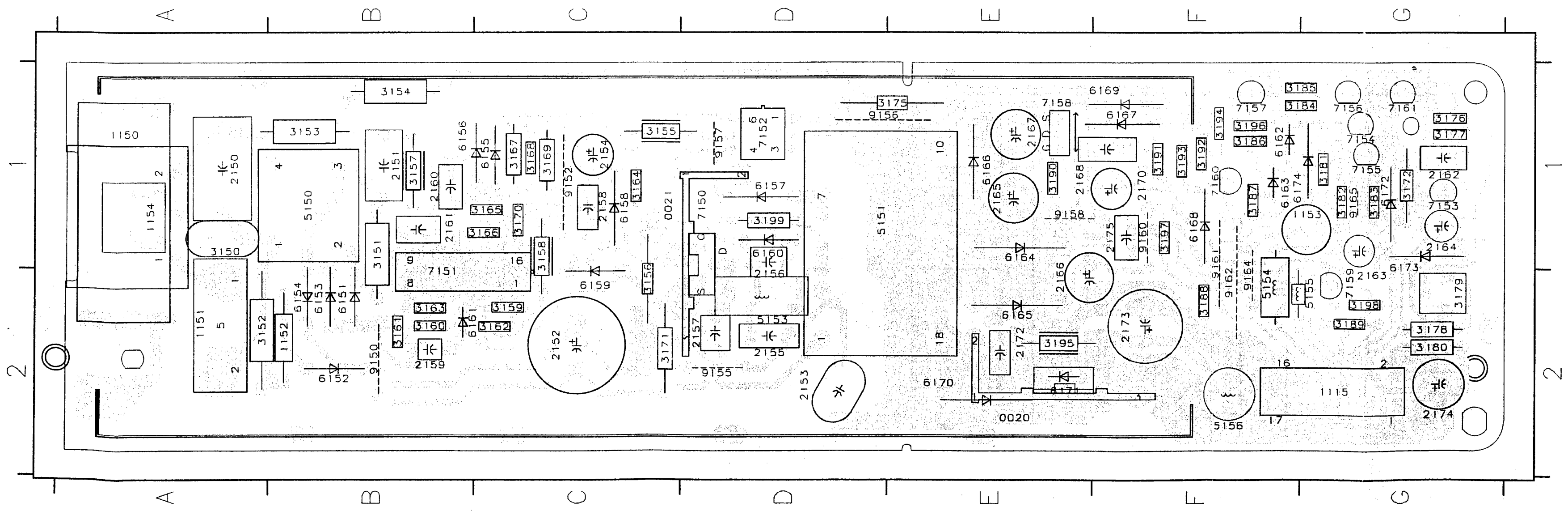

12VASW
12VA
5VASWA
MOBO VIDEO/ AUDIOLIN. PROCESSING (VS,AL)
3604
3605
5008
5003
5001
5VASW2
5VASW1
BUFFERS
7505 LA71525M
A-VCC C-VCC Y-VCC VCC2
VIDEO+LINEAR AUDIO PROCESSING
SERIAL DECODER
C_GND GNDAL Y_GND
7003 LC89980h
DELAY LINE
7604/7607
AUDIO ERASE OSCILLATOR SWITCH
12VASW
SCL 2
SDA 2
MOBO VS-SEC-PART
OPTION SECAM L/MSTD
BUFFERS
5VASWA
VREF
7066 TDA4722
VREF 2,5V
SECAM L PROCESSING
MOBO CHROMA NOISE REDUCTION (CNR)
5801
7807 TA1225
CHROMA NOISE REDUCTION
7803
OPAMP
MOBO (ER)
MAIN ERASE OSCILLATOR
MOBO FM AUDIO (AF)
7651 TDA 9616H
FM AUDIO
IIC BUS
3654
3653
SCL
SDA
MOBO HEAD AMPLIFIER (HA)
5100
5VASWA
5101
5VASWA
7108 STV5742DT
7103 STV5744
VIDEO HEAD-AMPLIFIER
Only for HIFI
7104 STV5712
AUDIO HEAD AMPLIFIER
SDA 2
SCL 2
14VM1
14VDC
SCL
SDA
5VASWA
5VASW
5VD
SDA3
SCL3
MOBO DECK ELECTRONICS & CONTROL PART (AI01,AI02,DE)
14VM1
5VD
5451
5VD2
5471
7443 SAA1310
CTL INTERFACE
7446 TDA5241
HEAD MOTOR DRIVER
3428
3440
104,105 111,122
7406 TMP93C071
DECK & CONTROL μP
5452
7452
RAM
5453
7451
EPROM
SENSORS
3371
7407
LED DRIVER
7440 L2722
LOADING MOTOR DRIVER
5VD
9_14VM2
TO CAPSTAN
5/1946
7/1946
MOBO VPS/PDC/ OSD-PART (VPO)
5VASWA
5855
5851
5853
3857
3858
7857 BA7046F
H-PLL
7851 SDA5652
VPS/PDC/ OSD
7855 7856
VIDEO BUFFERS
MOBO (PE)
7091
SHIFT REGISTER
5VD
SCRCLK
ODAT
STROBE
SCL
SDA
3439
3437
SCL3
SDA3
3414
3413
7401
E^2 PROM
3407
3403
4/1944
2/1944
14/1944
11
13/1900
5200
2200 220m
14
12
1/1900
14VDC
INT
SCL
SDA
3210
3214
7200
FRONT CONTROLLER
7202
DISPLAY
DISPLAY CONTROL (DC)
CSW
HEST
ISTBY
28VNEG
HELO
HEHI
9_14VM2
13/1944
8/1944
6/1944
7/1944
5/1944
2/1900
7/1900
9/1900
8/1900
10/1900
3250
6250
3251
3252
9_14VM2

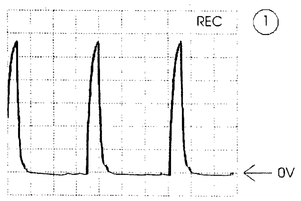
A20_BS.DWG
HG_0398

Power Supply (ASM)

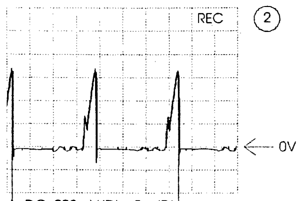
0005	A2
0010	A1
0015	E2
0016	D1
0020	E2
0021	C1
1115	G2
1150	A1
1151	A2
1152	B2
1153	G1
1154	A1
2150	A1
2151	B1
2152	C2
2153	D2
2154	C1
2155	D2
2156	D1
2157	D2
2158	C1
2159	B2
2160	B1
2161	B1
2162	G1
2163	G2
2164	G1
2165	E1
2166	F2
2167	E1
2168	F1
2170	E1
2172	E2
2173	F2
2174	G2
2175	F1
3150	A1
3151	B1
3152	A2
3153	B1
3154	B1
3155	C1
3156	C2
3157	B1
3158	C1
3159	C2
3160	B2
3161	B2
3162	C2
3163	B2
3164	C1
3165	C1
3166	C1
3167	C1
3168	C1
3169	C1
3170	C1
3171	C2
3172	G1
3175	E1
3176	G1
3177	G1
3178	G2
3179	G2
3180	G2
3181	G1
3182	G1
3183	G1
3184	G1
3185	G1
3186	F1
3187	F1
3188	F2
3189	G2
3190	E1
3191	F1
3192	F1
3193	F1
3194	F1
3195	E2
3196	F1
3197	F1
3198	G2
3199	D1
5150	B1
5151	D1
5153	D2
5154	F2
5155	G2
5156	F2
6151	B2
6152	B2
6153	B2
6154	B2
6155	C1
6156	B1
6157	D1
6158	C1
6159	C1
6160	D1
6161	B2
6162	F1
6163	F1
6164	E1
6165	E2
6166	E1
6167	F1
6168	F1
6169	F1
6170	E2
6171	E2
6172	G1
6173	G1
6174	F1
7150	D1
7151	B2
7152	D1
7153	G1
7154	G1
7155	G1
7156	G1
7157	F1
7158	E1
7159	G2
7160	F1
7161	G1
9150	B2
9152	C1
9155	D2
9156	D1
9157	D1
9158	E1
9160	F1
9161	F1
9162	F2
9164	F2
9165	G1


A
B
C
D
E
F
G
1
2
1150
1154
1151
5150
7151
2152
5151
1115
5156
1153
0005
0010
0015
0020
0021
0016

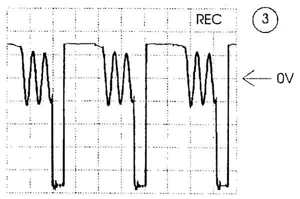

A
B
C
D
E
F
G
1
2
1150
1154
1151
5150
7151
2152
5151
1115
5156
1153
0020
0021



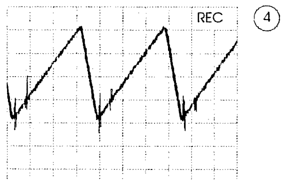
A: DC, 2 V/Div, 5us/Div
Gate 7150



A: DC, 200mV/Div, 5us/Div
Source 7150

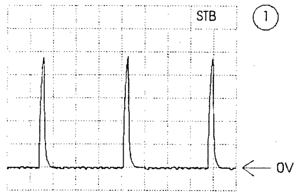


A: DC, 10 V/Div, 5us/Div
5151 Pin 7

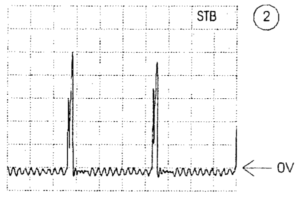


A: DC, 500mV/Div, 5us/Div
IC 7151 Pin 10

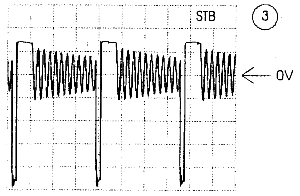
Low Power Standby



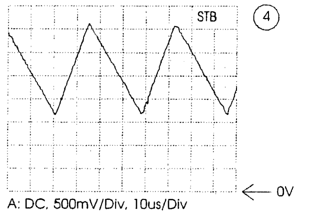
A: DC, 2 V/Div, 10us/Div
Gate 7150



A: DC, 100mV/Div, 10us/Div
Source 7150



A: DC, 10 V/Div, 10us/Div
5151 Pin 7



A: DC, 500mV/Div, 10us/Div
IC 7151 Pin 10

Power Supply (ASM)

Interconnections Manual Page

AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35

0005 F1
0010 F2
0015 H10
0016 B7
0020 H11
0021 B6
1115 F15
1150 G2

1151 H4
1152 H6
1153 F13
1154 G3
2150 H5
2151 G6
2152 H7
2153 H9

2154 F6
2155 E7
2156 D8
2157 C7
2158 D6
2159 E3
2160 D1
2161 C1

2162 A10
2163 B12
2164 B14
2165 C10
2166 D10
2167 E10
2168 F11
2170 F11

2172 G10
2173 H11
2174 H12
2175 E12
3150 H4
3151 H6
3152 H5
3153 H8

3154 H9
3155 E6
3156 E8
3157 F6
3158 C6
3159 C5
3160 E4
3161 E3

3162 E2
3163 E2
3164 E1
3165 E1
3166 D1
3167 D1
3168 C1
3169 B2

3170 B3
3171 E6
3172 A11
3175 A9
3176 A9
3177 A10
3178 A10
3179 A10

3180 B10
3181 A11
3182 B11
3183 B11
3184 B13
3185 B12
3186 B13
3187 C14

3188 E13
3189 E14
3190 E12
3191 E10
3192 E11
3193 E11
3194 E11
3195 G10

3196 C12
3197 E12
3198 E13
3199 C7
5150 H5
5151 B8
5153 C7
5154 D11

5155 D13
5156 G12
6151 H6
6152 H7
6153 G6
6154 G7
6155 F6
6156 F6

6157 E8
6158 E7
6159 D7
6160 D7
6161 D5
6162 B14
6163 B14
6164 C10

6165 D10
6166 D10
6167 F10
6168 F11
6169 F10
6170 G10
6171 H10
6172 B13

6173 C13
6174 A14
7150 C6
7151 B2
7152 A8
7153 B10
7154 A12
7155 B12

7156 B12
7157 C13
7158 E12
7159 E13
7160 E12
7161 A12
F1501 F15
F1502 E15

F1503 E15
F1504 E14
F1505 E14
F1506 E15
F1507 E15
F1508 E15
F1509 D15
F1510 D15

F1511 D14
F1512 D15
F1513 D14
F1514 D14
F1515 D15
F1516 C15
F1517 C15
F9150 H3

F9151 H4
F9152 H4
F9153 H5
F9154 E6
F9155 H7
F9156 H7
F9157 E9
F9158 G3

F9159 G4
F9160 F12
F9161 F12
F9162 F13
F9163 F13
F9164 E13
I001 B3
I002 B3

I003 C2
I004 C2
I005 D2
I006 D1
I007 E2
I008 E1
I009 E2
I010 E3

I011 H5
I012 H6
I013 H6
I014 G7
I015 F7
I016 E6
I017 E7
I018 E7

I019 E6
I020 E7
I021 D7
I022 C5
I023 C6
I024 C7
I025 C5
I026 C7

I027 C7
I028 C8
I029 D8
I030 E8
I031 E8
I032 H9
I033 G10
I034 F9

I035 F10
I036 D10
I037 D9
I038 C10
I039 B10
I040 A8
I041 A9
I042 B9

I043 A9
I044 B9
I045 A10
I046 B10
I047 A10
I048 B10
I049 A11
I050 A12

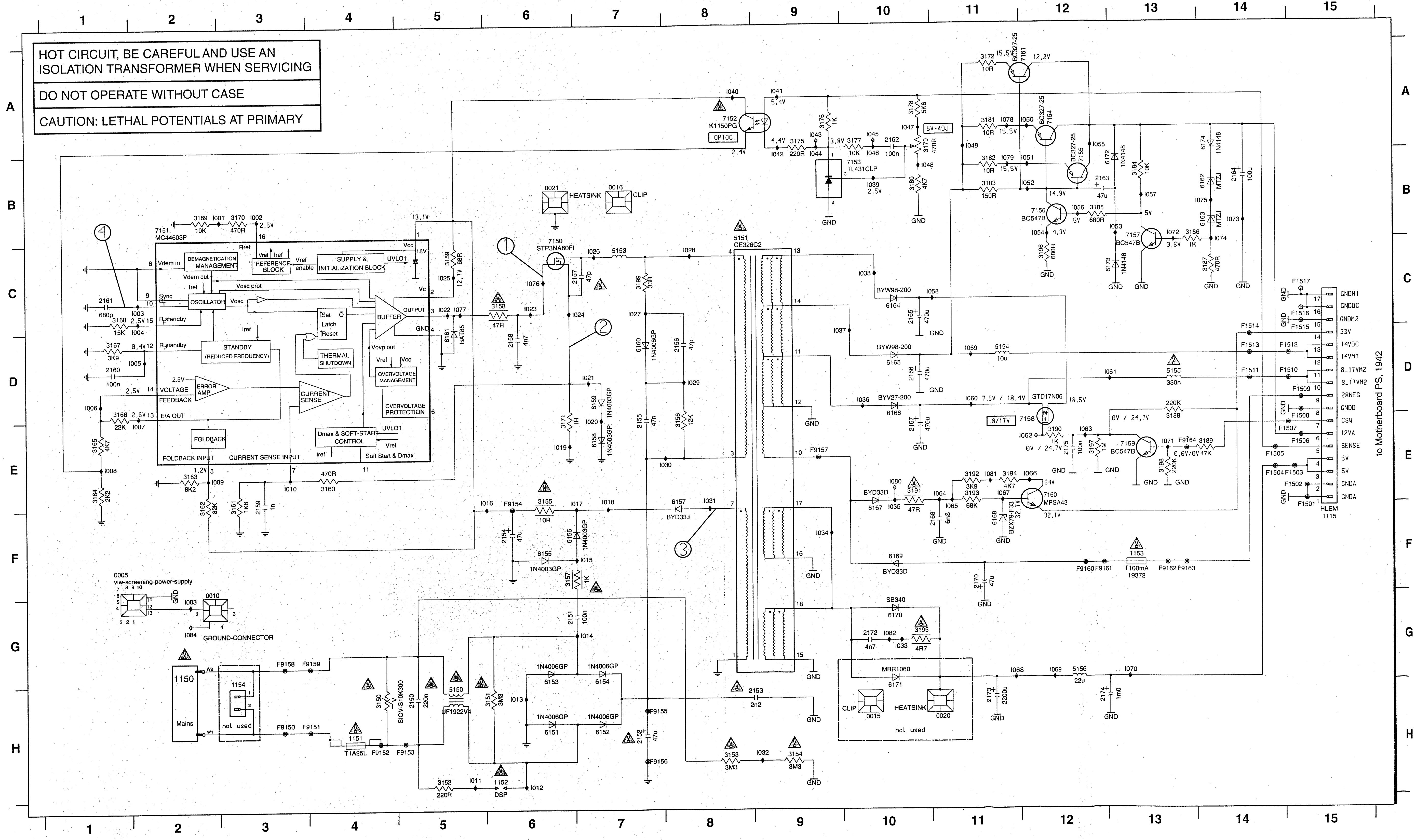
I051 B12
I052 B12
I053 B13
I054 B12
I055 A12
I056 B12
I057 B13
I058 C11

I059 D11
I060 D11
I061 D13
I062 E12
I063 E12
I064 E11
I065 F11
I066 E12

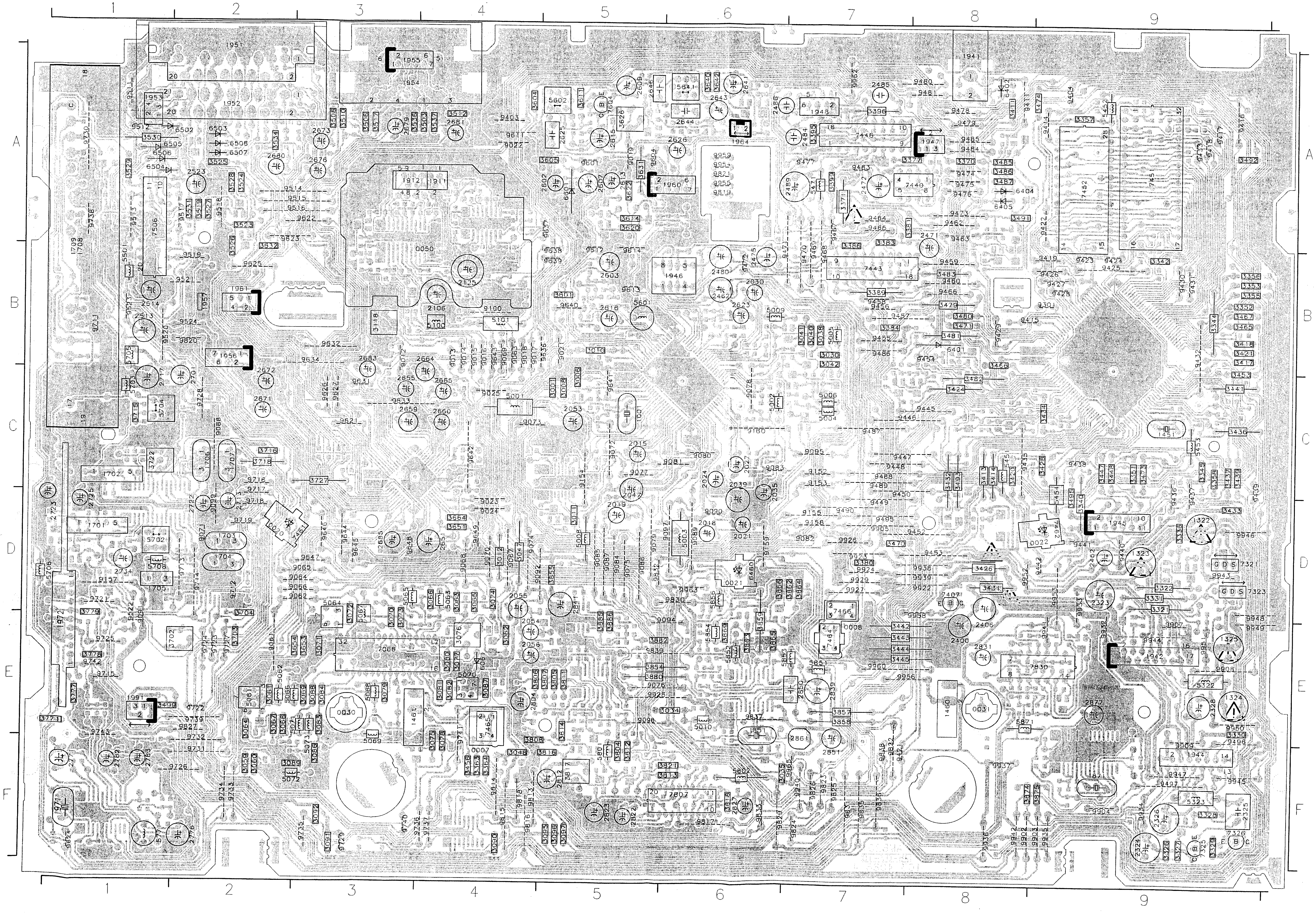
I067 E11
I068 G11
I069 G12
I070 G13
I071 E13
I072 B13
I073 B14
I074 C14

I075 B14
I076 C6
I077 C5
I078 A11
I079 B11
I080 E10
I081 E11
I082 G10

I083 G2
I084 G2


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
HOT CIRCUIT, BE CAREFUL AND USE AN ISOLATION TRANSFORMER WHEN SERVICING
DO NOT OPERATE WITHOUT CASE
CAUTION: LETHAL POTENTIALS AT PRIMARY
7151
MC44603P
DEMAGNETICATION MANAGEMENT
REFERENCE BLOCK
SUPPLY & INITIALIZATION BLOCK
UVLO1
OSCILLATOR
BUFFER
OUTPUT
STANDBY (REDUCED FREQUENCY)
THERMAL SHUTDOWN
OVERVOLTAGE MANAGEMENT
OVERVOLTAGE PROTECTION
ERROR AMP
CURRENT SENSE
FOLDBACK
Dmax & SOFT-START CONTROL
FOLDBACK INPUT
CURRENT SENSE INPUT
Soft Start & Dmax
VOLTAGE FEEDBACK
E/A OUT
Vdem in
Vdem out
Sync
Rstandby
Latch
Set
Reset
Vovp out
Vref
Vcc
Rref
13,1V
2,5V
7150
STP3NA60FI
0021
HEATSINK
0016
CLIP
7152
K1150PG
OPTOC
5,4V
2,4V
7153
TL431CLP
5V-ADJ
5151
CE326C2
BYW98-200
6164
6165
BYV27-200
6166
STD17N06
8/17V
7158
BYD33D
6167
6169
BYD33J
6157
SB340
6170
MBR1060
6171
CLIP
0015
HEATSINK
0020
not used
7161
BC327-25
7154
7155
7156
BC547B
7157
7159
7160
MPSA43
BZX79-F33
1N4148
MTZJ
12,2V
15,5V
14,9V
5V
4,3V
0,6V
18,5V
0V / 24,7V
7,5V / 18,4V
32,1V
64V
1153
T100mA
19372
HLEM
1115
to Motherboard PS, 1942
GNDM1
GNDDC
GNDM2
33V
14VDC
14VM1
8_17VM2
8_17VM2
28NEG
GNDD
CSW
12VA
SENSE
5V
5V
GNDA
GNDA
0005
viw-screening-power-supply
0010
GROUND-CONNECTOR
1150
Mains
1154
not used
1151
T1A25L
SIOV-S10K300
5150
UF1922V4
1N4006GP
6151
6152
6153
6154
1N4003GP
6155
6156
6158
6159
6160
1152
DSP
GND

Motherboard (MOBO)


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
1951
1952
1953
1954
1955
1912
1911
0050
1941
1946
1960
1961
1956
1964
1947
1948
1945
1942
1944
7446
7443
7440
7452
7506
7066
7807
7830
0030
0031
0020
0021
0022
0008
1701
1702
1703
1704
1706
1707
1709
1708
1972
1991
1461
1460
1451
1322
1323
1324
1325
7321
7323
7326

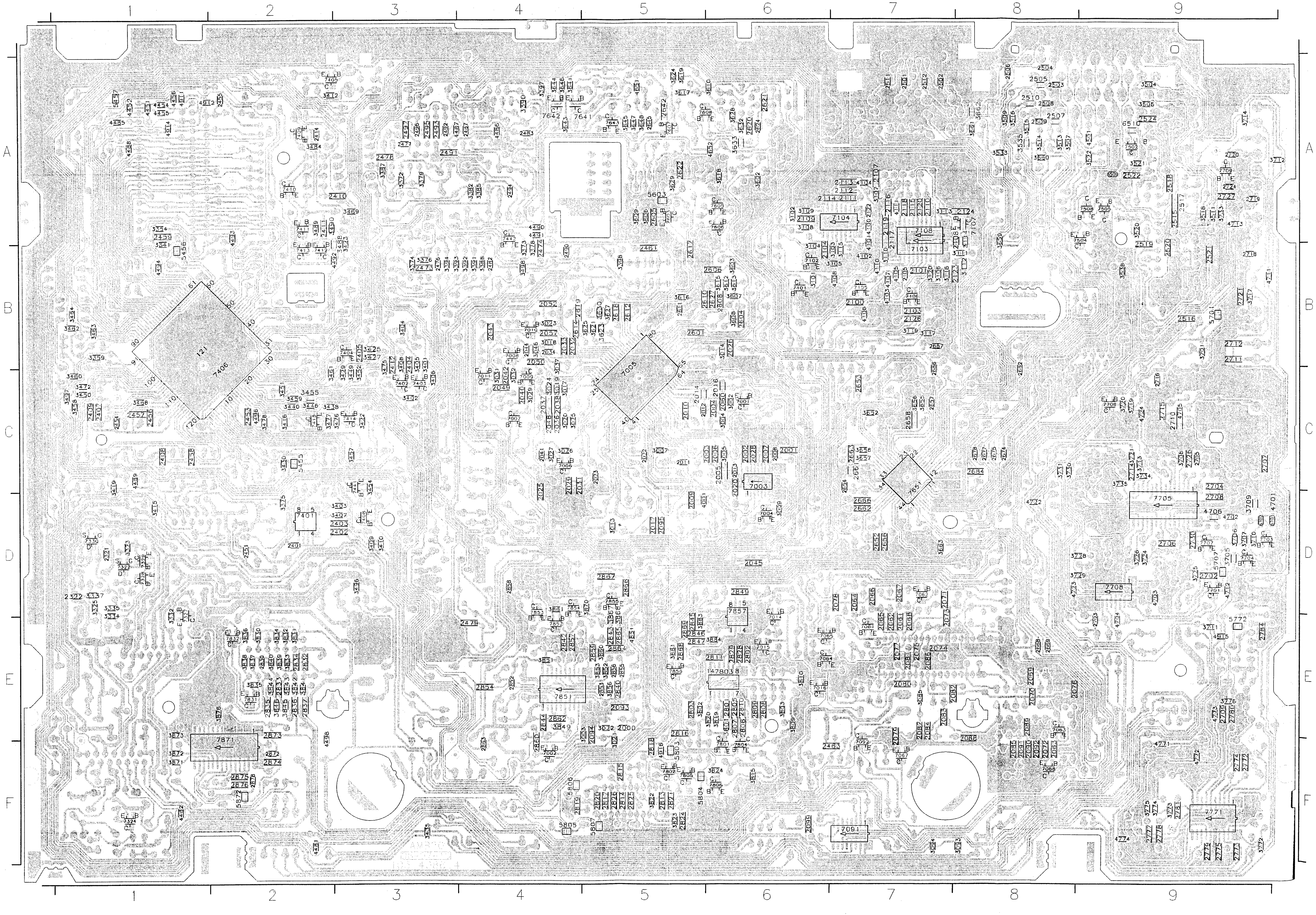
Component Mapping Motherboard

0007	F4
0008	E7
0020	D2
0021	D6
0022	D9
0030	E3
0031	E8
0050	B4
1001	C5
1322	D9
1323	D9
1324	E9
1325	E9
1451	C9
1460	E8
1461	E3
1701	D1
1702	C1
1703	D2
1704	D2
1705	D1
1706	C2
1707	C2
1708	B1
1709	B1
1851	E6
1871	F9
1911	A4
1912	A3
1941	A8
1942	E9
1944	F9
1945	D9
1946	B6
1947	A8
1948	A7
1951	A2
1952	A2
1953	A1
1954	A3
1955	A3
1956	B2
1957	B2
1960	A6
1961	B2
1964	A6
1971	F1
1972	E1
1991	E1
2015	C5
2018	D6
2019	D5
2021	D6
2024	C6
2027	C6
2030	B6
2035	C6
2039	C6
2047	D5
2053	C5
2054	E4
2055	D4
2056	E4
2106	B4
2125	B4
2323	D9
2324	F9
2325	F9
2326	F9
2328	E9
2400	E8
2406	E8
2452	D9
2462	B6
2471	A8
2472	A7
2475	B6
2480	B6
2484	A7
2485	A7
2486	A6
2489	A7
2513	B1
2514	B1
2523	A2
2602	A5
2603	B5
2607	A5
2609	A5
2613	A5
2615	A5
2616	B5
2623	B6
2625	A5
2626	A6
2641	A6
2643	A6
2644	A6
2646	A5
2651	D4
2655	C3
2659	C3
2660	C4
2664	B4
2665	C4
2671	C2
2672	C2
2673	A3
2676	A3
2679	A3
2680	A2
2681	A4
2683	B3
2685	D3
2701	C2
2713	D2
2717	C1
2722	D2
2723	D1
2725	D1
2734	D1
2771	F1
2776	F2
2782	F1
2783	F1
2804	E4
2812	F5
2822	F5
2823	F5
2827	F6
2831	E8
2839	E7
2841	D5
2850	E7
2851	F7
2861	E7
2877	E9
3001	C5
3006	C5
3008	C5
3010	B5
3011	D5
3012	D4
3030	B7
3034	E6
3035	F7
3038	B7
3040	B7
3041	B7
3042	B7
3047	D4
3048	F4
3059	F2
3060	F2
3061	E2
3062	E4
3063	D4
3064	E2
3065	D4
3066	D4
3067	E2
3068	E2
3069	E3
3070	E3
3071	E3
3072	E3
3073	E3
3074	D4
3075	F4
3076	E4
3077	E4
3078	F4
3079	E3
3080	E4
3081	E4
3082	E4
3083	E3
3084	E3
3086	F3
3087	E4
3088	E3
3089	F3
3090	F4
3091	F3
3092	F3
3095	F5
3096	F5
3097	F5
3118	B3
3321	D9
3322	D9
3326	F9
3327	F9
3328	F9
3329	F9
3330	E9
3331	D9
3336	D9
3340	D9
3342	B9
3344	B9
3345	C9
3351	C9
3352	B9
3353	B9
3355	B9
3356	B9
3357	A9
3358	C9
3363	F4
3364	F4
3370	A8
3371	A7
3377	A8
3380	D7
3381	A7
3383	A7
3384	B7
3386	A7
3389	B7
3395	A7
3396	A7
3399	A7
3411	A8
3413	C8
3414	C8
3417	B9
3418	B9
3420	C8
3421	B9
3424	C8
3426	D8
3428	C9
3431	D8
3432	C8
3433	D9
3434	C9
3436	C9
3437	C9
3439	C9
3441	C9
3442	E7
3443	E7
3444	E7
3445	E7
3447	C9
3448	C9
3453	B9
3456	F4
3465	B9
3466	B8
3467	B9
3470	D7
3471	B8
3473	C9
3474	A9
3479	B8
3480	B8
3481	B8
3482	C8
3483	B8
3485	A8
3486	A8
3487	A8
3491	A8
3492	A9
3493	C8
3495	D9
3499	E1
3503	A4
3506	A3
3508	A3
3510	A3
3512	A4
3517	A3
3519	A2
3523	A2
3524	A2
3525	A2
3526	B2
3527	A2
3528	A2
3529	A1
3530	A1
3531	A2
3532	B2
3534	A2
3536	A3
3537	A4
3601	B5
3604	A4
3605	A5
3611	A5
3614	A5
3620	A5
3622	A5
3626	A5
3631	A5
3640	A6
3642	A6
3651	D4
3653	E3
3654	E3
3664	D4
3702	E2
3703	E2
3704	E2
3715	C1
3716	C2
3718	C2
3722	C1
3727	C3
3771	E1
3777	E1
3778	E1
3779	E1
3804	F5
3805	E5
3806	E4
3807	E5
3808	F4
3811	E5
3812	F5
3813	F6
3814	E5
3816	F5
3817	F5
3818	F6
3821	F6
3854	E5
3855	D5
3857	E7
3858	E7
3859	E6
3862	D7
3863	E6
3864	D7
3865	E6
3866	D6
3869	E6
3874	F8
3875	F9
3880	E5
3882	E5
3885	E5
3886	E5
5001	C4
5002	C6
5003	D6
5004	C7
5005	B7
5006	C7
5008	D5
5009	B6
5010	E6
5061	E2
5062	E2
5063	D4
5064	D3
5065	D3
5066	E2
5067	E3
5068	E3
5069	F3
5070	E4
5071	E3
5072	F3
5073	F3
5100	B4
5101	B4
5322	E9
5323	F9
5451	C8
5452	A9
5453	C9
5454	C9
5471	A7
5501	B1
5601	B5
5602	A5
5641	A6
5702	D1
5703	C1
5704	C1
5705	B1
5706	D1
5708	D1
5771	F1
5801	F5
5802	F6
5851	E7
5852	E6
5853	E7
5854	E6
5856	D6
5871	E8
6061	E4
6401	B8
6402	A8
6404	A8
6405	A8
6460	D6
6502	A2
6503	A2
6504	A1
6505	A1
6506	A1
6507	A2
6508	A2
6601	A5
7066	E3
7321	D9
7323	D9
7325	F9
7326	F9
7407	D8
7440	A8
7443	B7
7446	A7
7451	A9
7452	A9
7461	D3
7462	D9
7464	E7
7465	E4
7466	D7
7506	A1
7604	A5
7807	F6
7830	E9
9012	B3
9013	B4
9014	B4
9015	B4
9016	B4
9017	B4
9018	B4
9019	A5
9021	B5
9022	A4
9023	D4
9024	D4
9025	C4
9061	E2
9062	D3
9063	B4
9064	D3
9065	D3
9066	D3
9067	D4
9068	D4
9069	B4
9070	D4
9071	D2
9072	C5
9073	C4
9074	D4
9075	D5
9076	E5
9077	C5
9078	C6
9079	D5
9080	C6
9081	C6
9082	D7
9083	C6
9084	D5
9085	D5
9086	D5
9087	D5
9088	C2
9089	D6
9090	D6
9091	E1
9092	D4
9094	E6
9095	C7
9097	D6
9098	E5
9099	D2
9100	B4
9152	C7
9153	C7
9154	C5
9155	D7
9157	D1
9158	D7
9159	D6
9160	C6
9301	B9
9403	A4
9404	A9
9411	A8
9414	A9
9415	B8
9416	A9
9417	A9
9418	A9
9419	B9
9421	F7
9422	A9
9423	B9
9424	B9
9425	B9
9426	B9
9427	B9
9428	B9
9429	B8
9430	B9
9431	B9
9432	B9
9433	A9
9435	C8
9436	C9
9437	C9
9438	C9
9439	C9
9440	D9
9441	D9
9442	D9
9445	C8
9446	C7
9447	C7
9448	C7
9449	D7
9450	C7
9452	D8
9453	D8
9454	B8
9455	B7
9456	B7
9457	B7
9458	B7
9459	B8
9460	B8
9462	A8
9463	A8
9464	A7
9465	A7
9466	B8
9467	A7
9468	B7
9469	B7
9470	B7
9471	B6
9472	B6
9473	A8
9474	A8
9475	A8
9476	A8
9477	A7
9478	A8
9479	A8
9480	A8
9481	A8
9483	A7
9484	A8
9485	A8
9486	B7
9487	C7
9488	C7
9489	C7
9490	D7
9495	D7
9496	E9
9497	F9
9511	A1
9512	A1
9513	A1
9514	A2
9515	A3
9516	A3
9517	A2
9518	A2
9519	B2
9520	B1
9521	B2
9522	E1
9523	B1
9524	B2
9601	A5
9604	A5
9611	A4
9612	B5
9613	B5
9614	B5
9621	C3
9622	A3
9623	A2
9624	F1
9625	B2
9626	C3
9627	C3
9631	C3
9632	B3
9633	C3
9634	B3
9636	B5
9637	A5
9638	B5
9639	B5
9640	B5
9641	C5
9642	C4
9643	B4
9644	D3
9645	D3
9646	D3
9647	D3
9648	D3
9649	D4
9711	B1
9712	D2
9713	D2
9714	D2
9715	E1
9716	C2
9717	D2
9718	D2
9719	D2
9721	D1
9722	E2
9723	E2
9724	E2
9725	E1
9726	F2
9727	E2
9728	C2
9729	F3
9730	A1
9731	F2
9732	F2
9733	F2
9734	F2
9735	F3
9736	F4
9737	F4
9738	A1
9739	E2
9740	F3
9741	E4
9742	E1
9743	E1
9813	F4
9814	F4
9815	F4
9816	F4
9817	F6
9818	F4
9819	A6
9820	B2
9821	A6
9822	F7
9823	F7
9824	F7
9825	F7
9826	F7
9827	E2
9829	F6
9830	D6
9831	F7
9832	D5
9833	F6
9835	F7
9836	F7
9837	E6
9838	F7
9839	E5
9902	F8
9903	F9
9904	F9
9905	D7
9907	E9
9908	E9
9909	E9
9922	D8
9923	D7
9924	D7
9925	E5
9926	D7
9927	D7
9929	D7
9932	E9
9933	D9
9934	F9
9935	F9
9936	F8
9937	F8
9938	D8
9939	D8
9940	F7
9941	E9
9942	F8
9943	D9
9944	E9
9945	F9
9946	D9
9947	F9
9948	D9
9949	E9
9950	E9
9951	E9
9952	D8
9953	D9
9954	A6
9955	A6
9956	E8
9958	D8
9959	A6
9960	E7
9962	A7
9963	D6
9965	F7

Component Mapping Motherboard

2000	E5
2001	C6
2002	C6
2003	C5
2004	C6
2005	C6
2006	C6
2007	C6
2008	C6
2009	D5
2010	C5
2011	C5
2012	C5
2013	C6
2014	C5
2016	C6
2017	D5
2020	C6
2022	C5
2023	C5
2025	D4
2026	B6
2028	C6
2029	C4
2031	C4
2032	B4
2033	B4
2034	B4
2036	C4
2037	C4
2038	C4
2040	C4
2041	C4
2042	C4
2043	B4
2044	B4
2045	D6
2048	C4
2049	C4
2050	B4
2052	B4
2057	B4
2060	C6
2061	E7
2062	E7
2063	F8
2064	D7
2065	E7
2066	D7
2067	D7
2068	E7
2069	E8
2070	E8
2071	D7
2072	F8
2073	E7
2074	E7
2075	E7
2076	E8
2077	E7
2078	D7
2079	E7
2080	E7
2081	E7
2082	E7
2083	E7
2084	E7
2085	F8
2086	E7
2087	E7
2088	E8
2089	E8
2090	F8
2091	F8
2092	F8
2093	E5
2094	E5
2095	D5
2099	F6
2100	B7
2101	B7
2103	B7
2104	B6
2105	B7
2107	A7
2108	A8
2109	A6
2110	A7
2111	A7
2112	A7
2113	A7
2114	A6
2115	A7
2116	A7
2117	A7
2118	A7
2119	A7
2120	A7
2122	A7
2123	B7
2124	A8
2126	B7
2321	D1
2322	D1
2401	D2
2402	D3
2403	D3
2404	B3
2405	B3
2407	C1
2408	C1
2409	C1
2410	A3
2411	A2
2412	B3
2414	A2
2451	D2
2453	C2
2454	C1
2455	A2
2456	C1
2457	C1
2458	C1
2459	A1
2461	B5
2463	F7
2473	B3
2474	B4
2476	B3
2477	A3
2478	A3
2479	E4
2482	B4
2483	A4
2487	A4
2490	B4
2491	A3
2492	A3
2493	A3
2494	A4
2495	A3
2496	A3
2497	A3
2501	A7
2502	A7
2503	A8
2504	A8
2505	A8
2506	A8
2507	A8
2508	A8
2509	A8
2510	A8
2511	A7
2512	A7
2515	A9
2516	B9
2517	A9
2518	A9
2519	B9
2520	B9
2521	B9
2522	A9
2524	A9
2601	B5
2604	B6
2605	A5
2606	B6
2608	B6
2610	B5
2611	B5
2612	B5
2614	B4
2617	B5
2618	B5
2619	B4
2620	A6
2621	A6
2622	A5
2624	A6
2627	B6
2642	A5
2645	A5
2652	D7
2653	C7
2654	C7
2656	D7
2657	C7
2658	C7
2661	C7
2662	D7
2663	C7
2666	D7
2668	E8
2669	E8
2674	C8
2675	C8
2677	C8
2678	C8
2682	C8
2684	C8
2686	C7
2687	B7
2702	D9
2703	E9
2704	C9
2705	C9
2706	D9
2707	C9
2708	D9
2709	E9
2710	C9
2711	B9
2712	B9
2714	C9
2715	C9
2716	C9
2718	B9
2719	A9
2720	A9
2721	B9
2724	A9
2726	C9
2727	A9
2730	D9
2772	F9
2773	F9
2774	F9
2775	F9
2777	F9
2778	F9
2779	F9
2780	E9
2781	F9
2784	E9
2801	E6
2802	E6
2803	E5
2805	E6
2806	E6
2807	E6
2808	E6
2809	E6
2810	E6
2811	E6
2813	F5
2814	F5
2815	F5
2816	E5
2817	F5
2818	F5
2819	F4
2820	F5
2821	F5
2824	F5
2825	F5
2826	F5
2828	E6
2829	E6
2830	E2
2832	E2
2833	E2
2834	E2
2835	E2
2836	E2
2837	E2
2840	E5
2842	E4
2843	E5
2844	E4
2845	E5
2846	E5
2847	E5
2849	D6
2852	E4
2853	E5
2854	E4
2855	E5
2856	E5
2857	E4
2858	D4
2859	E5
2860	F4
2862	E4
2863	F4
2864	E5
2865	E5
2866	D5
2867	D5
2868	E5
2869	E5
2872	F2
2873	E2
2874	F2
2875	F2
2876	F2
2878	F2
3002	C6
3003	E5
3004	C6
3005	C6
3007	C5
3009	D6
3013	D5
3014	B6
3017	C4
3018	B4
3019	C4
3020	C4
3021	F5
3022	E5
3023	B4
3024	C4
3025	C4
3026	C4
3027	C4
3029	C4
3031	C4
3032	C4
3037	B4
3046	B4
3085	E7
3093	F8
3094	F7
3101	B6
3102	A6
3103	B7
3104	B6
3105	B7
3106	B7
3107	A7
3108	A6
3109	A6
3110	B7
3111	B8
3112	B8
3113	A7
3114	A8
3115	B7
3116	B7
3117	B7
3119	B7
3120	B7
3323	D1
3325	D1
3332	D1
3334	D1
3335	D1
3337	D1
3341	A1
3354	A1
3359	B1
3372	A3
3373	B4
3374	B3
3375	D2
3376	B3
3378	B4
3379	A3
3382	A4
3385	A4
3387	A3
3388	B4
3390	A4
3391	B4
3392	B4
3393	B3
3394	B3
3397	A4
3398	B5
3401	B3
3402	C3
3403	D3
3404	B3
3405	B3
3406	C3
3407	D3
3408	B3
3409	D3
3410	D3
3412	A2
3415	D1
3416	C2
3419	C1
3422	C3
3423	B3
3425	B3
3427	B3
3429	C3
3430	C2
3435	F3
3438	C2
3440	C2
3446	C2
3449	C3
3450	C1
3451	C2
3452	C3
3454	C3
3455	C2
3457	C3
3458	C1
3459	C2
3460	C1
3461	C2
3462	B1
3463	B1
3464	B1
3468	C1
3469	A3
3472	C1
3475	B3
3476	C3
3477	C2
3478	C2
3484	A2
3488	B3
3489	A2
3490	A2
3496	D3
3497	C1
3498	B4
3504	A9
3505	A9
3507	A8
3509	A8
3511	A9
3513	A8
3514	A8
3515	A8
3516	A8
3518	A9
3520	A9
3521	A9
3522	A9
3533	A8
3535	A8
3538	B9
3602	A6
3603	B6
3606	A5
3607	B6
3608	B6
3609	A5
3610	A6
3612	B6
3613	B6
3615	B6
3616	B5
3617	A5
3618	A6
3619	A5
3621	B5
3623	B5
3624	A5
3625	B5
3627	B5
3628	A6
3629	A5
3630	B5
3632	A6
3633	A6
3641	A4
3643	A4
3644	A4
3645	A5
3646	A4
3647	A5
3648	A5
3652	C7
3655	C7
3656	C7
3657	C7
3658	C7
3659	A8
3660	A8
3661	A8
3662	A8
3663	D7
3701	B9
3705	D9
3706	D9
3707	D9
3708	C9
3709	D9
3710	D9
3711	E9
3712	A9
3713	C9
3714	A9
3717	B9
3719	C9
3720	C9
3721	C9
3724	D9
3725	D9
3726	D9
3728	D9
3729	D8
3730	C8
3731	C8
3733	A9
3734	C9
3735	C9
3772	F9
3773	F9
3774	F9
3775	F9
3776	E9
3801	E6
3802	E5
3803	E6
3809	E6
3810	E6
3815	F6
3819	E6
3820	E6
3822	F5
3823	F5
3824	F6
3830	E2
3831	E2
3832	E2
3833	E2
3834	E2
3835	E2
3836	E2
3837	E2
3838	E2
3839	E2
3840	E2
3841	E2
3842	E2
3843	E2
3844	E2
3845	E2
3846	E2
3849	E4
3851	E4
3852	E5
3853	E5
3856	E5
3860	E5
3861	D4
3867	E5
3868	E5
3870	D5
3871	F1
3872	F1
3873	E1
3876	E2
3881	E5
3883	E5
3884	E6
4001	D5
4100	A7
4101	B7
4102	B7
4103	B7
4104	A7
4105	B7
4106	B7
4107	B7
4108	B7
4110	B7
4111	A7
4451	A1
4452	A1
4454	A1
4455	A1
4456	A1
4481	F2
4482	F1
4485	A1
4486	A4
4487	A3
4488	A1
4489	C1
4490	A4
4491	A4
4492	B2
4493	A2
4494	B1
4496	C2
4498	E2
4501	A9
4651	A5
4652	A6
4701	D9
4702	D9
4703	D9
4704	E9
4705	C9
4706	D9
4711	B9
4712	D9
4713	A9
4722	D8
4723	D8
4724	C9
4771	F9
4772	F9
4773	E9
4774	F9
4851	E5
4911	A1
4912	A1
4914	A1
4915	E9
4916	F5
5455	C2
5456	B1
5457	A1
5603	A5
5701	B9
5707	D9
5772	E9
5803	F5
5804	F5
5805	F4
5806	F4
5807	F5
5872	F2
6509	A9
6510	A9
6701	D9
6702	D9
7001	C6
7002	F4
7003	C6
7004	D6
7005	C5
7006	C4
7007	C4
7008	B4
7009	C4
7010	B4
7011	C4
7014	E6
7015	E6
7016	E6
7061	E7
7062	D7
7063	E8
7064	E6
7065	E6
7067	F7
7068	F8
7091	F7
7092	F7
7101	B6
7102	B6
7103	B7
7104	A7
7105	B7
7106	B7
7107	A8
7108	A7
7322	D1
7324	F1
7327	D1
7328	D1
7329	D1
7330	D1
7401	D2
7402	C3
7403	C3
7404	B3
7405	A2
7406	C2
7408	D3
7409	A2
7410	A2
7411	A2
7412	B2
7413	B2
7414	C3
7415	C2
7441	C3
7442	A4
7502	A9
7504	A9
7505	A9
7508	A9
7603	A5
7605	A6
7606	A6
7607	A5
7608	A5
7641	A5
7642	A4
7643	A5
7651	C7
7701	D9
7703	D9
7704	D9
7705	D9
7706	C9
7707	D9
7708	D9
7709	A9
7771	F9
7801	F6
7802	F5
7803	E6
7804	F6
7805	F5
7806	F6
7831	E2
7832	E2
7851	E4
7852	E4
7853	D4
7854	D4
7855	D5
7856	E5
7857	D6
7871	E2

Motherboard (MOBO)

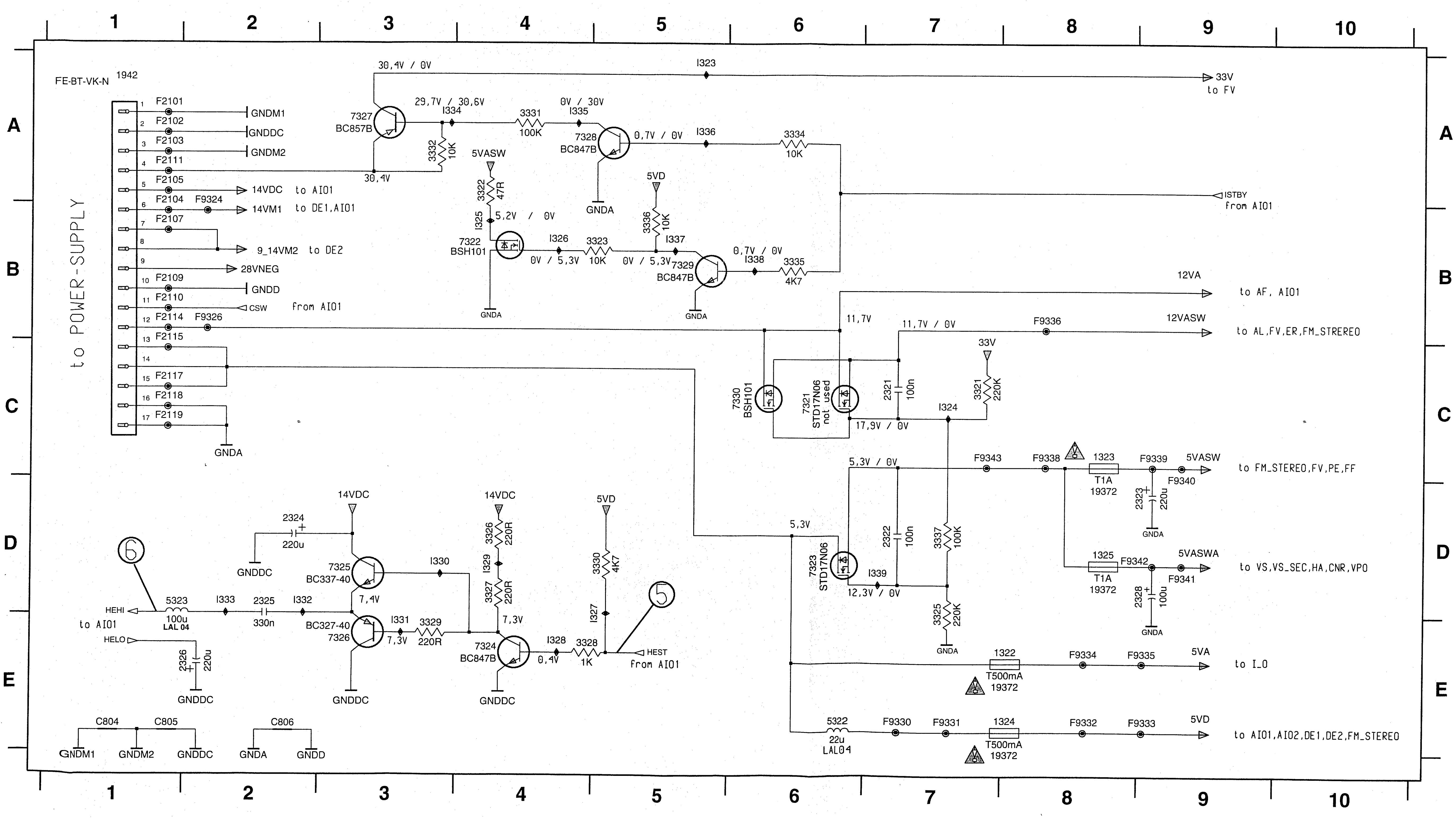

1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
7406
7005
7651
7705
7708
7771
7851
7871
7857
7003
7091
7104
7108
7103
7407

Supply Part (PS)

Interconnections Manual Page

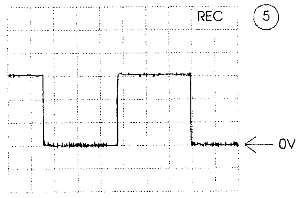
AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35

1323 C8	2321 C7	2325 D2	3322 A4	3327 D4	3331 A4	3336 B5	7321 C6	7325 D3	7329 B5	C806 E2	F2104 B1	F2110 B1	F2117 C1	F9326 B2	F9333 E9	F9338 C8	F9342 D8	I325 B4	I329 D4	I333 D2	I337 B5
1324 E8	2322 D7	2326 E2	3323 B5	3328 E4	3332 A3	3337 D7	7322 B4	7326 E3	7330 C6	F2101 A1	F2105 A1	F2111 A1	F2118 C1	F9330 E7	F9334 E8	F9339 C9	F9343 C7	I326 B4	I330 D3	I334 A3	I338 B6
1325 D8	2323 D9	2328 D9	3325 D7	3329 E3	3334 A6	5322 E6	7323 D6	7327 A3	C804 E1	F2102 A1	F2107 B1	F2114 B1	F2119 C1	F9331 E7	F9335 E9	F9340 D9	I323 A5	I327 D5	I331 E3	I335 A4	I339 D7

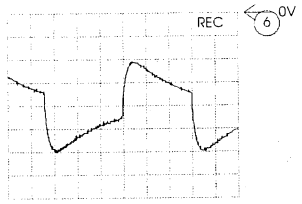

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
FE-BT-VK-N
1942
to POWER-SUPPLY
F2101
GNDM1
F2102
GNDDC
F2103
GNDM2
F2111
F2105
14VDC to AI01
F2104
F9324
14VM1 to DE1,AI01
F2107
9_14VM2 to DE2
28VNEG
F2109
GNDD
F2110
CSW from AI01
F2114
F9326
F2115
F2117
F2118
F2119
GNDA
30,4V / 0V
7327
BC857B
30,4V
29,7V / 30,6V
I334
3332
10K
3331
100K
0V / 30V
I335
7328
BC847B
0,7V / 0V
I336
3334
10K
GNDA
I323
33V
to FV
ISTBY
from AI01
5VASW
3322
47R
I325
5,2V / 0V
7322
BSH101
GNDA
I326
0V / 5,3V
3323
10K
5VD
3336
10K
I337
0V / 5,3V
7329
BC847B
GNDA
0,7V / 0V
I338
3335
4K7
12VA
to AF, AI01
11,7V
11,7V / 0V
F9336
12VASW
to AL,FV,ER,FM_STRERE0
33V
7330
BSH101
7321
STD17N06
not used
2321
100n
3321
220K
I324
17,9V / 0V
5,3V / 0V
F9343
F9338
1323
T1A
19372
F9339
5VASW
F9340
to FM_STEREO,FV,PE,FF
2323
220u
GNDA
5,3V
7323
STD17N06
2322
100n
3337
100K
I339
12,3V / 0V
3325
220K
GNDA
1325
T1A
19372
F9342
5VASWA
F9341
to VS,VS_SEC,HA,CNR,VPO
2328
100u
GNDA
1322
T500mA
19372
F9334
F9335
5VA
to I_O
5322
22u
LAL04
F9330
F9331
1324
T500mA
19372
F9332
F9333
5VD
to AI01,AI02,DE1,DE2,FM_STEREO
14VDC
2324
220u
GNDDC
7325
BC337-40
7,4V
BC327-40
7326
I330
14VDC
3326
220R
I329
3327
220R
7,3V
5VD
3330
4K7
I327
6
HEHI
to AI01
5323
100u
LAL 04
I333
2325
330n
I332
HELO
2326
220u
GNDDC
I331
7,3V
3329
220R
7324
BC847B
I328
0,4V
3328
1K
5
HEST
from AI01
GNDDC
GNDDC
C804
C805
C806
GNDM1
GNDM2
GNDDC
GNDA
GNDD

3-23

Oscillograms Supply Part



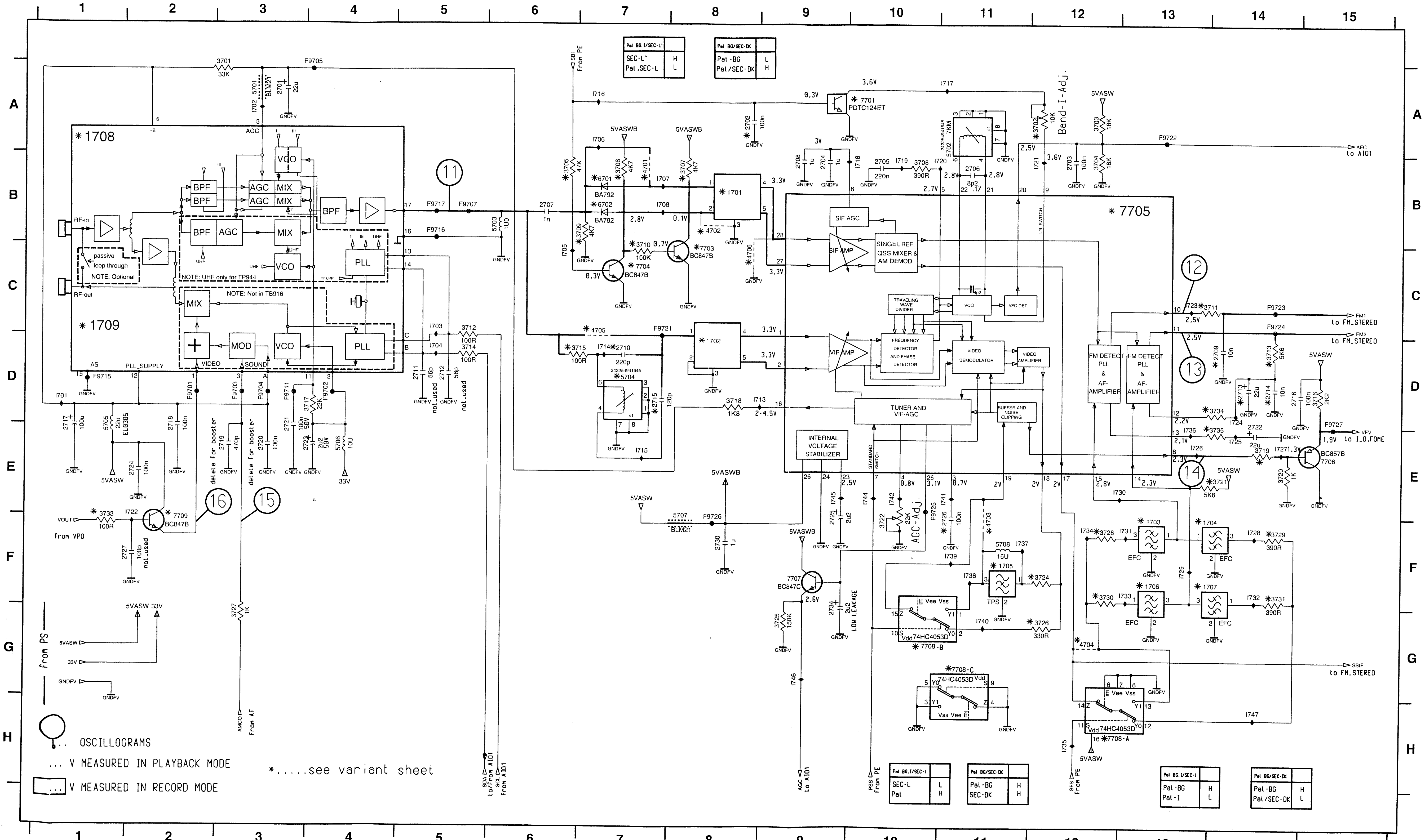
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13

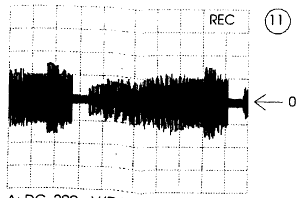


A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5

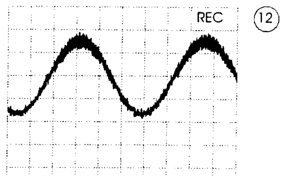
Frontend (FV)

1701	B8
1702	D8
1703	F13
1704	F14
1705	F11
1706	F13
1707	F14
1708	A1
1709	C1
2701	A3
2702	A8
2703	B12
2704	B9
2705	B10
2706	B11
2707	B6
2708	B9
2709	D14
2710	D7
2711	D5
2712	D5
2713	D14
2714	D14
2715	D7
2716	D14
2717	E1
2718	E2
2719	E3
2720	E3
2721	E3
2722	D14
2723	E4
2724	E2
2725	F9
2726	F11
2727	F2
2730	F8
2734	G9
3701	A3
3702	A12
3703	A12
3704	B12
3705	B6
3706	B7
3707	B8
3708	B10
3709	B7
3710	C7
3711	C13
3712	C5
3713	D14
3714	D5
3715	D6
3716	D15
3717	D4
3718	D8
3719	E14
3720	E14
3721	E14
3722	E10
3724	F12
3725	G9
3726	G12
3727	G3
3728	F12
3729	F14
3730	F12
3731	F14
3733	F1
3734	D14
3735	E14
4701	B7
4702	B8
4703	F11
4704	G12
4705	C7
4706	C8
5701	A3
5702	B11
5703	B6
5704	D7
5705	E1
5706	E4
5707	E8
5708	F11
6701	B7
6702	B7
7701	A10
7703	C8
7704	C7
7705	B12
7706	E15
7707	F9
7708	G10
7708	G11
7708	H12
7709	F2
F9701	D2
F9702	D4
F9703	D3
F9704	D3
F9705	A4
F9707	B5
F9711	D3
F9715	D1
F9716	B5
F9717	B5
F9721	C7
F9722	A13
F9723	C14
F9724	C14
F9725	E10
F9726	F8
F9727	D15
I701	D1
I702	A3
I703	C5
I704	D5
I705	C6
I706	A7
I707	B7
I708	B7
I713	D8
I714	D7
I715	E7
I716	A7
I717	A11
I718	B10
I719	B10
I720	B10
I721	B12
I722	E2
I723	C13
I724	D14
I725	E14
I726	E13
I727	E14
I728	F14
I729	F13
I730	E12
I731	F13
I732	F14
I733	F13
I734	F12
I735	H12
I736	E13
I737	F11
I738	F11
I739	F11
I740	G11
I741	E11
I742	E10
I744	E10
I745	E9
I746	G9
I747	H14

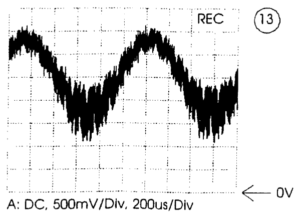

*1708
*1709
RF-in
RF-out
passive loop through
NOTE: Optional
BPF
AGC
MIX
VCO
PLL
NOTE: UHF only for TP944
NOTE: Not in TB916
MOD
VIDEO
SOUND
AS
PLL_SUPPLY
AGC
3701
33K
F9705
5701
BLM21
2701 22u
F9717
F9707
F9716
2707 1n
5703 1U0
1703
1704
3712 100R
3714 100R
2711 56p
2712 56p
not_used
1701
2717 100u
5705 22u
2718 100n
2724 100n
5VASW
GNDFV
F9701
F9703
F9704
F9711
F9702
F9715
3717 22K
2721 100n
2723 2u2 50V
5706 10U
33V
delete for booster
2719 470p
2720 100n
VOUT
from VPO
*3733 100R
1722
*7709 BC847B
2727 100p not_used
5VASW 33V
5VASW
33V
GNDFV
from PS
3727 1K
AMCO
from AF
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
V MEASURED IN RECORD MODE
*.....see variant sheet
SDA to/from AI01
SCL from AI01
SB1 from PE
1716
5VASWB
1706
*3705 47K
*3706 4K7
*4701
*3707 4K7
*6701 BA792
*6702 BA792
1707
1708
2.8V
0.1V
*3709 4K7
*3710 100K
0.7V
*7703 BC847B
*7704 BC847B
0.3V
*1701
*4702
*4706
*4705
*3715 100R
1714
*2710 220p
*5704
2715 120p
1715
F9721
*1702
3718 1K8
1713
2-4.5V
3.3V
5707 BLM21
F9726
2730 1u
5VASWB
*2702 100n
0.3V
3.6V
*7701 PDTC124ET
1717
2708 1u
2704 1u
1718
2705 220n
1719
3708 390R
1720
5702 7KM
2706 8p2
2.8V
2.7V
2.5V
1721
3.6V
2703 100n
*3702 10K
Bend-I-Adj.
5VASW
3703 18K
3704 18K
F9722
AFC to AI01
*7705
SIF AGC
SIF AMP.
SINGEL REF. QSS MIXER & AM DEMOD.
TRAVELING WAVE DIVIDER
VCO
AFC DET.
VIF AMP
FREQUENCY DETECTOR AND PHASE DETECTOR
VIDEO DEMODULATOR
VIDEO AMPLIFIER
TUNER AND VIF-AGC
BUFFER AND NOISE CLIPPING
FM DETECT PLL & AF-AMPLIFIER
INTERNAL VOLTAGE STABILIZER
STANDARD SWITCH
L/L' SWITCH
1723
*3711
F9723
FM1 to FM_STEREO
F9724
FM2 to FM_STEREO
2709 10n
*3713 5K6
*2713 22u
*2714 10n
2716 100n
3716 2K2
F9727
VFV to I.O.FOME
1.9V
*3734
1736
*3735
2722 22u
1724
1725
1726
3719
1727
1.3V
7706 BC857B
3720 1K
*3721 5K6
2.1V
2.2V
2.3V
*2745
2725 2u2
3722 22K
1742
ACC-Adj.
1744
1745
F9725
*2726 100n
1741
*4703
5708 15U
1737
*1705
TPS
*3724
1738
1739
1740
*3726 330R
7707 BC847C
2.6V
3725 150K
2734 2u2
LOW LEAKAGE
1746
AGC to AI01
PSS from PE
E Vee Vss
74HC4053D
*7708-B
*7708-C
Vss Vee
*7708-A
1730
*1703
*1704
EFC
*3728
1731
1728
*3729 390R
1729
*1706
*1707
*3730
1733
1732
*3731 390R
*4704
SSIF to FM_STEREO
1747
1735
SFS from PE
5VASW
Pal BG,I/SEC-L'
SEC-L' H
Pal,SEC-L L
Pal BG/SEC-DK
Pal-BG L
Pal/SEC-DK H
Pal BG,I/SEC-L
SEC-L L
Pal H
Pal BG/SEC-DK
Pal-BG H
SEC-DK H
Pal BG,I/SEC-I
Pal-BG H
Pal-I L
Pal BG/SEC-DK
Pal-BG H
Pal/SEC-DK L
⑪
⑫
⑬
⑭
⑮
⑯



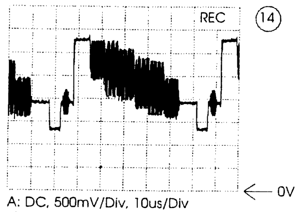
A: DC, 200mV/Div, 10us/Div
Tuner Pin 17



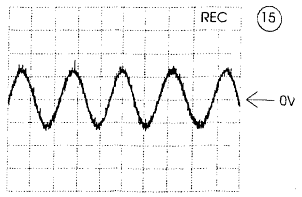
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 10



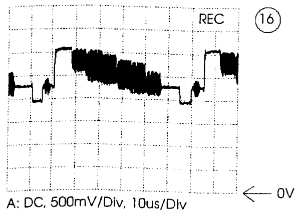
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 11



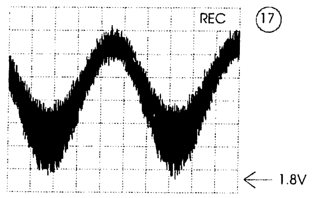
A: DC, 500mV/Div, 10us/Div
IC 7705 Pin 8



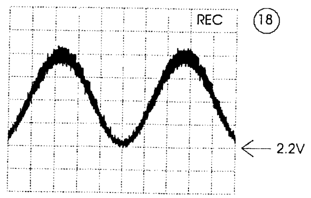
A: DC, 500mV/Div, 500us/Div
Tumod Pin 3



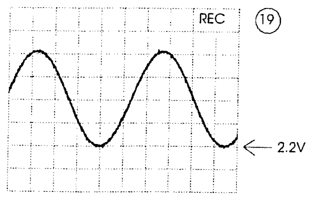
A: DC, 500mV/Div, 10us/Div
Tumod Pin 1



A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 8



A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 7

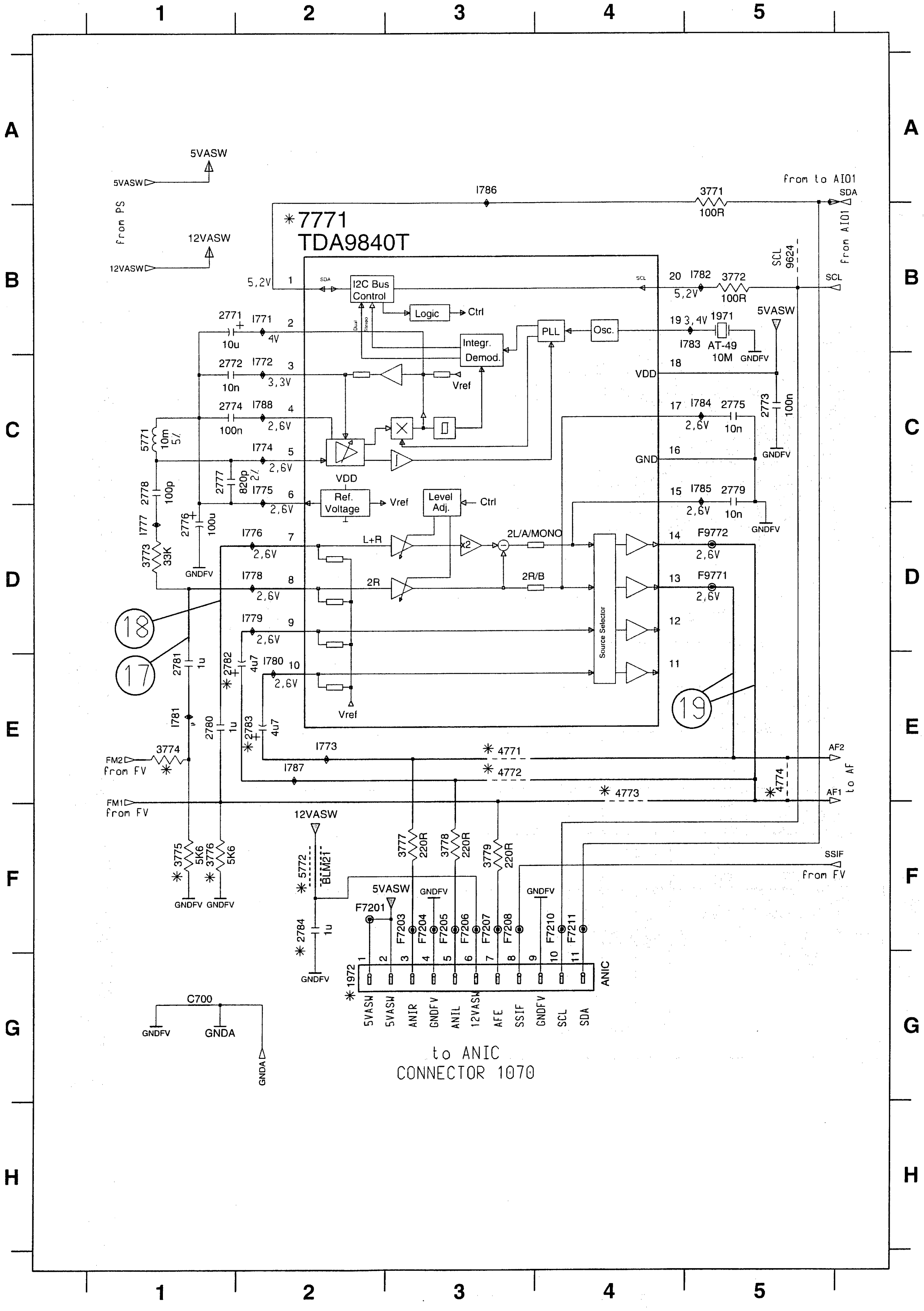


A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 13/14

Stereo Decoder (FM_STEREO)

Interconnections Manual Page

AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35



1
2
3
4
5
A
B
C
D
E
F
G
H
5VASW
5VASW
from PS
12VASW
12VASW
*7771
TDA9840T
I786
3771
100R
from to AIO1
SDA
from AIO1
SCL
9624
5,2V
I2C Bus Control
Logic
Ctrl
Integr. Demod.
PLL
Osc.
Vref
VDD
GND
Ref. Voltage
Level Adj.
L+R
x2
2L/A/MONO
2R
2R/B
Source Selector
I782
3772
100R
5,2V
I971
AT-49
10M
I783
GNDFV
I784
2775
10n
2773
100n
I785
2779
10n
F9772
F9771
2,6V
2771
10u
I771
4V
2772
10n
I772
3,3V
2774
100n
I788
2,6V
I774
I775
2777
820p
5771
10m
2778
100p
I777
2776
100u
3773
33K
I776
I778
I779
I780
2781
1u
2782
4u7
2783
4u7
I781
2780
3774
FM2
from FV
FM1
from FV
I773
I787
*4771
*4772
*4773
*4774
AF2
to AF
AF1
12VASW
3775
5K6
3776
5K6
5772
BLM21
3777
220R
3778
220R
3779
220R
SSIF
from FV
5VASW
F7201
F7203
F7204
F7205
F7206
F7207
F7208
F7210
F7211
2784
1u
1972
ANIC
5VASW
5VASW
ANIR
GNDFV
ANIL
12VASW
AFE
SSIF
GNDFV
SCL
SDA
to ANIC
CONNECTOR 1070
C700
GNDFV
GNDA
GNDA
18
17
19

1971 B5
1972 G2
2771 B1
2772 C1
2773 C5
2774 C1
2775 C5
2776 D1
2777 C1
2778 C1
2779 C5
2780 E1
2781 E1
2782 E1
2783 E2
2784 F2
3771 A5
3772 B5
3773 D1
3774 E1
3775 F1
3776 F1
3777 F3
3778 F3
3779 F3
4771 E3
4772 E3
4773 E4
4774 E5
5771 C1
5772 F2
7771 B2
9624 B5
C700 G1
F7201 F2
F7203 F3
F7204 F3
F7205 F3
F7206 F3
F7207 F3
F7208 F3
F7210 F4
F7211 F4
F9771 D5
F9772 D5
I771 B2
I772 C2
I773 E2
I774 C2
I775 C2
I776 D2
I777 D1
I778 D2
I779 D2
I780 E2
I781 E1
I782 B5
I783 B5
I784 C5
I785 C5
I786 A3
I787 E2
I788 C2

Variant List Frontend

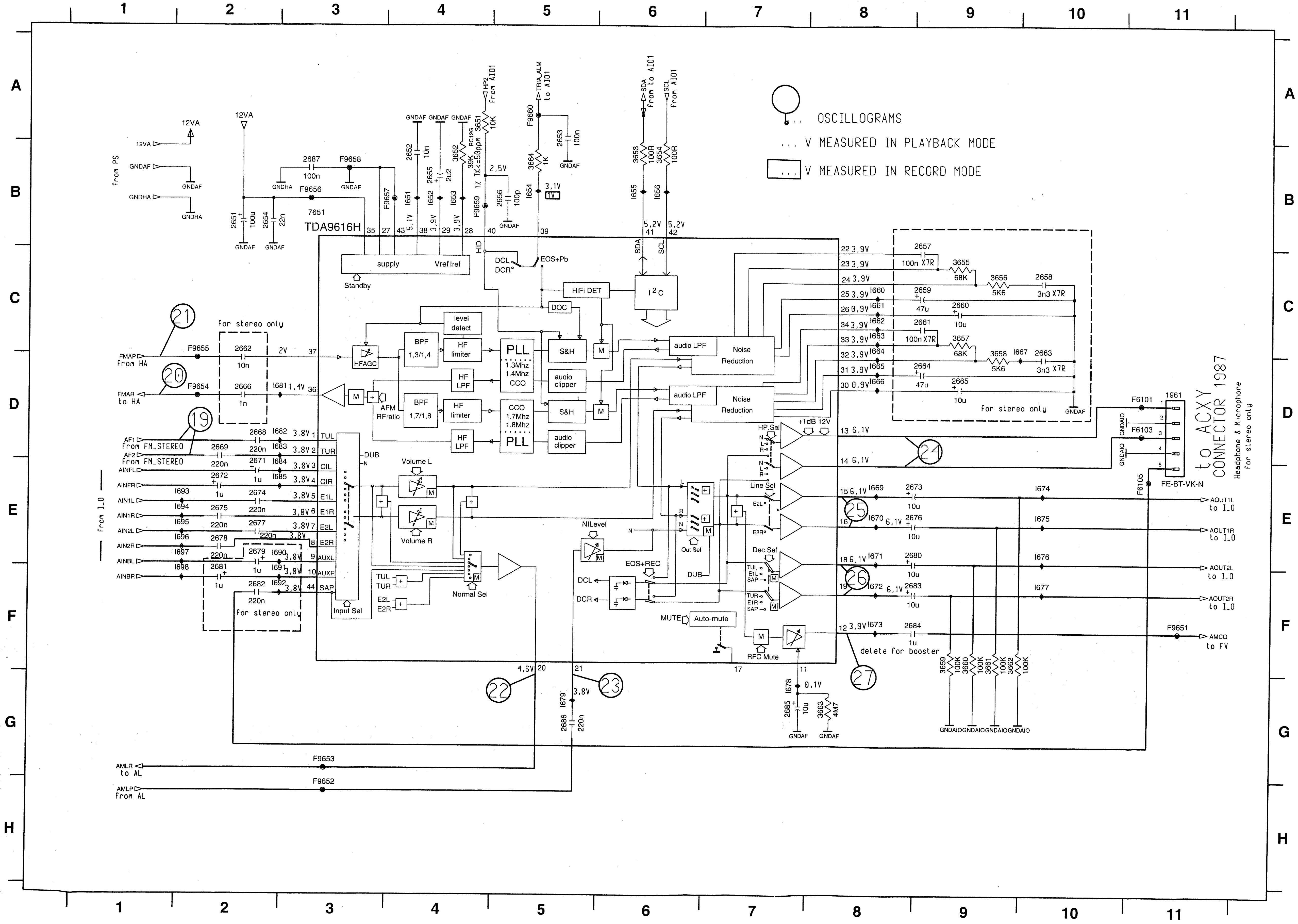
	PAL BG	PAL BG	PAL I FULLBAND	PAL I FULLBAND	PAL, BG,I SEC L L'	PAL, BG,I SEC L L'	PAL,SEC, BG/DK	PAL,SEC, BG/DK	K1
Pos.	FM/NICAM Stereo	MONO Interc.	NICAM Stereo	MONO Interc.	FM/NICAM Stereo	MONO	FM/NICAM Stereo	MONO	MONO
1701	G9353M	-	K9463M	-	K9456M	K9456M	K9463M	K9463M	L9360M
1702	G3956M	G1961M	K3953M	J1980M	K3953M	G1965M	G3956M	G3956M	G3956M
1703	EFC 5,5	EFC 5,5	EFC 6,0	EFC 6,0	EFC 5,5	EFC 5,5	EFC 5,5	EFC 5,5	EFC 6,5
1704	-	-	-	-	EFC 6,0	EFC 6,0	EFC 6,5	EFC 6,5	-
1705	TPS 5,5	TPS5,5	TPS6,0	TPS6,0	TPS 5,5	TPS 5,5	TPS 5,5	TPS 5,5	TPS 6,5
1706	EFC 5,74	-	-	-	EFC 5,74	-	EFC 5,74	-	-
1707	-	-	-	-	-	-	EFC 6,25	-	-
2702	-	-	-	-	100n	100n	-	-	-
2707	1n	-	1n	-	1n	1n	1n	1n	1n
2709	-	10n	10n	10n	-	-	-	10n	10n
2710	-	-	-	-	220p	220p	-	-	-
2713	22u	-	-	-	22u	-	22u	-	-
2714	-	-	-	-	-	10n	-	-	-
2715	-	-	-	-	120p	120p	-	-	-
2724	not used	-	-	-	not used	-	not used	-	-
2726	-	-	-	-	100n	100n	-	-	-
3702	-	-	-	-	10k	10k	-	-	-
3705	-	-	-	-	47k	47k	47k	47k	-
3706	-	-	-	-	4k7	4k7	4k7	4k7	-
3707	-	-	-	-	4k7	4k7	4k7	4k7	-
3709	-	-	-	-	4k7	4k7	4k7	4k7	-
3710	-	-	-	-	100k	100k	100k	100k	-
3711	4k7	5k6	5k6	5k6	4k7	0E	0E	5k6	4k7
3713	-	-	-	-	-	5k6	-	-	-
3715	-	-	-	-	100E	100E	-	-	-
3719	1k	1k	820E	820E	820E	820E	820E	820E	1k
3721	5k6	-	-	-	5k6	-	5k6	-	-
3724	330E	330E	330E	330E	270E	270E	330E	330E	330E
3726	-	-	-	-	330E	330E	-	-	-
3728	470E	470E	470E	470E	390E	390E	390E	390E	470E
3729	-	-	-	-	390E	390E	390E	390E	-
3730	470E	-	-	-	390E	-	390E	-	-
3731	-	-	-	-	-	-	390E	-	-
3734	0E	-	-	-	0E	-	470E	-	-
3735	0E	0E	0E	0E	0E	0E	470E	0E	0E
4701	0E	-	0E	-	-	-	-	-	0E
4702	0E	-	0E	-	-	-	-	-	0E
4703	0E	0E	0E	0E	-	-	-	-	0E
4704	0E	0E	0E	0E	-	-	-	-	0E
4705	0E	0E	0E	0E	-	-	0E	0E	0E
4706	-	0E	-	0E	-	-	-	-	-
5704	-	-	-	-	41645	41645	-	-	-
6701	-	-	-	-	BA 792	BA 792	BA 792	BA 792	-
6702	-	-	-	-	BA 792	BA 792	BA 792	BA 792	-
7701	-	-	-	-	PDTC124	PDTC124	-	-	-
1708	TP916L MKII	TP916L MKII	-	-	TP926L MKII	TP926L MKII	-	-	-
1709	TMRG 1-107A	TMRG 1-107A	TMRG 1-109A	TMRG 1-109A	TMRG 2-103A	TMRG 2-103A	TMRG 1X204A	TMRG 1X204A	TMRG 1X204A
7703	-	-	-	-	BC847B	BC847B	BC847B	BC847B	-
7704	-	-	-	-	BC847B	BC847B	BC847B	BC847B	-
7705	TDA 9813T	TDA 9813T	TDA 9813T	TDA 9813T	TDA 9814T	TDA 9812T	TDA 9813T	TDA 9813T	TDA 9813T
7708	-	-	-	-	74HCT4053	74HCT4053	74HCT4053	74HCT4053	-

DELETE FOR BOOSTER: 2719, 2720, 3732, 3733, 7709.

Variant List Stereo Decoder

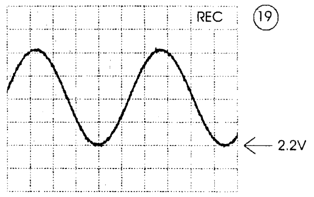
	PAL BG	PAL BG	PAL BG	PAL I fullband	PAL I fullband	PAL, BG,I SEC L L'	PAL, BG,I SEC L L'	PAL,SEC, BG/DK	PAL,SEC, BG/DK	PAL,SEC, BG/DK	K1
Pos.	FM Stereo	FM/NICAM Stereo	MONO	MONO	NICAM Stereo	FM/NICAM Stereo	MONO	FM- Stereo	FM/NICAM Stereo	MONO	MONO
2782	-	4u7	-	-	-	4u7	-	-	4u7	-	-
2783	-	4u7	-	-	-	4u7	-	-	4u7	-	-
2784	-	1u	-	-	1u	1u	-	-	1u	-	-
3774	4k7	4k7	-	-	-	4k7	-	0E	0E	-	-
3775	5k6	5k6	-	-	-	5k6	-	-	-	-	-
3776	5k6	5k6	-	-	-	5k6	-	-	-	-	-
4771	-	-	-	-	0E	-	-	-	-	-	-
4772	-	-	-	-	0E	-	-	-	-	-	-
4773	-	-	0E	0E	-	-	0E	-	-	0E	0E
5772	-	BML21	-	-	BML21	BML21	-	-	BML21	-	-
7771	TDA 9840 T	TDA 9840 T	-	-	-	TDA 9840 T	-	TDA 9840 T	TDA 9840 T	-	-
1972	-	ANIC (QNIC)	-	-	ANIC (QNIC)	ANIC (QNIC)	-	-	ANIC (QNIC)	-	-

FM Audio (AF)

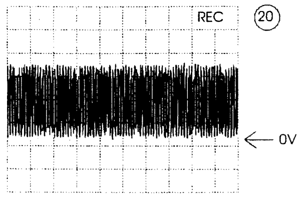

OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
TDA9616H
7651
12VA
GNDAF
GNDHA
From PS
supply
Vref Iref
Standby
HiFi DET
I²C
DOC
level detect
HFAGC
BPF 1,3/1,4
BPF 1,7/1,8
HF limiter
HF LPF
PLL
CCO
1.3Mhz 1.4Mhz
1.7Mhz 1.8Mhz
S&H
audio clipper
audio LPF
Noise Reduction
AFM RFratio
DCL DCR
EOS+Pb
SDA
SCL
From to AIO1
HP2 From AIO1
TRIA_ALM to AIO1
for stereo only
FMAP From HA
FMAR to HA
AF1 From FM_STEREO
AF2 From FM_STEREO
AINFL
AINFR
AIN1L
AIN1R
AIN2L
AIN2R
AINBL
AINBR
From I_O
TUL TUR CIL CIR E1L E1R E2L E2R AUXL AUXR SAP
DUB
Input Sel
Volume L
Volume R
Normal Sel
NILevel
EOS+REC
Out Sel
Line Sel
HP Sel
Dec.Sel
MUTE
Auto-mute
RFC Mute
+1dB 12V
AOUT1L to I_O
AOUT1R to I_O
AOUT2L to I_O
AOUT2R to I_O
AMCO to FV
delete for booster
AMLR to AL
AMLP From AL
to ACXY CONNECTOR 1987
Headphone & Microphone for stereo only
FE-BT-VK-N
GNDAIO
19
20
21
22
23
24
25
26
27

1961	D11
2651	B2
2652	B4
2653	A5
2654	B2
2655	B4
2656	B5
2657	B9
2658	C10
2659	C9
2660	C9
2661	C9
2662	C2
2663	C10
2664	D9
2665	D9
2666	D2
2668	D2
2669	D2
2671	E2
2672	E2
2673	E8
2674	E2
2675	E2
2676	E8
2677	E2
2678	E2
2679	E2
2680	E8
2681	F2
2682	F2
2683	F8
2684	F8
2685	G7
2686	G5
2687	B3
3651	A4
3652	B4
3653	B6
3654	B6
3655	C9
3656	C9
3657	C9
3658	C9
3659	F9
3660	F9
3661	F9
3662	F9
3663	G8
3664	B5
7651	B3
F6101	D11
F6103	D11
F6105	E11
F9651	F11
F9652	H3
F9653	G3
F9654	D2
F9655	C2
F9656	B3
F9657	B4
F9658	B3
F9659	B4
F9660	A5
I651	B4
I652	B4
I653	B4
I654	B5
I655	B6
I656	B6
I660	C8
I661	C8
I662	C8
I663	C8
I664	C8
I665	D8
I666	D8
I667	C9
I669	E8
I670	E8
I671	E8
I672	F8
I673	F8
I674	E10
I675	E10
I676	E10
I677	F10
I678	G7
I679	G5
I681	D2
I682	D2
I683	D2
I684	E2
I685	E2
I690	E2
I691	F2
I692	F2
I693	E2
I694	E2
I695	E2
I696	E2
I697	E2
I698	F2

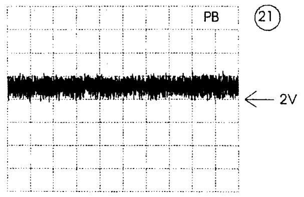
Oscillograms FM Audio, Erase Oscillator



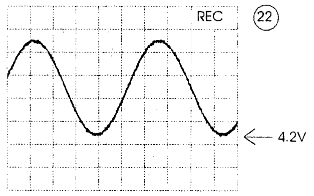
A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 13/14



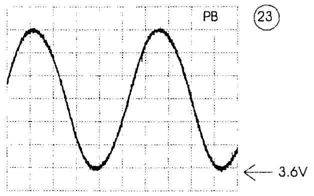
A: DC, 200mV/Div, 5ms/Div
FMAR



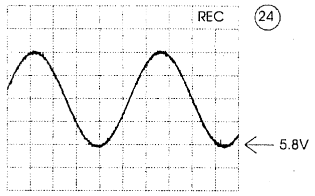
A: AC, 200mV/Div, 500us/Div
FMAP



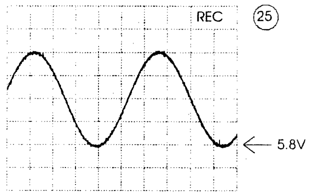
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 20



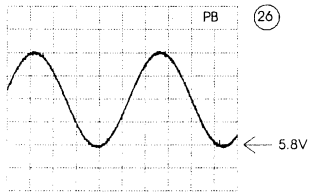
A: AC, 100mV/Div, 200us/Div
IC 7651 Pin 21



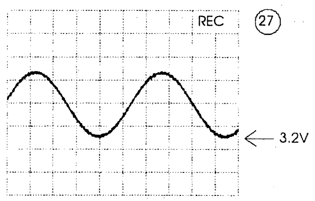
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 13/14



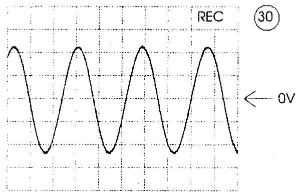
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 15/16



A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 18/19



A: AC, 500mV/Div, 200us/Div
IC 7651 Pin 12



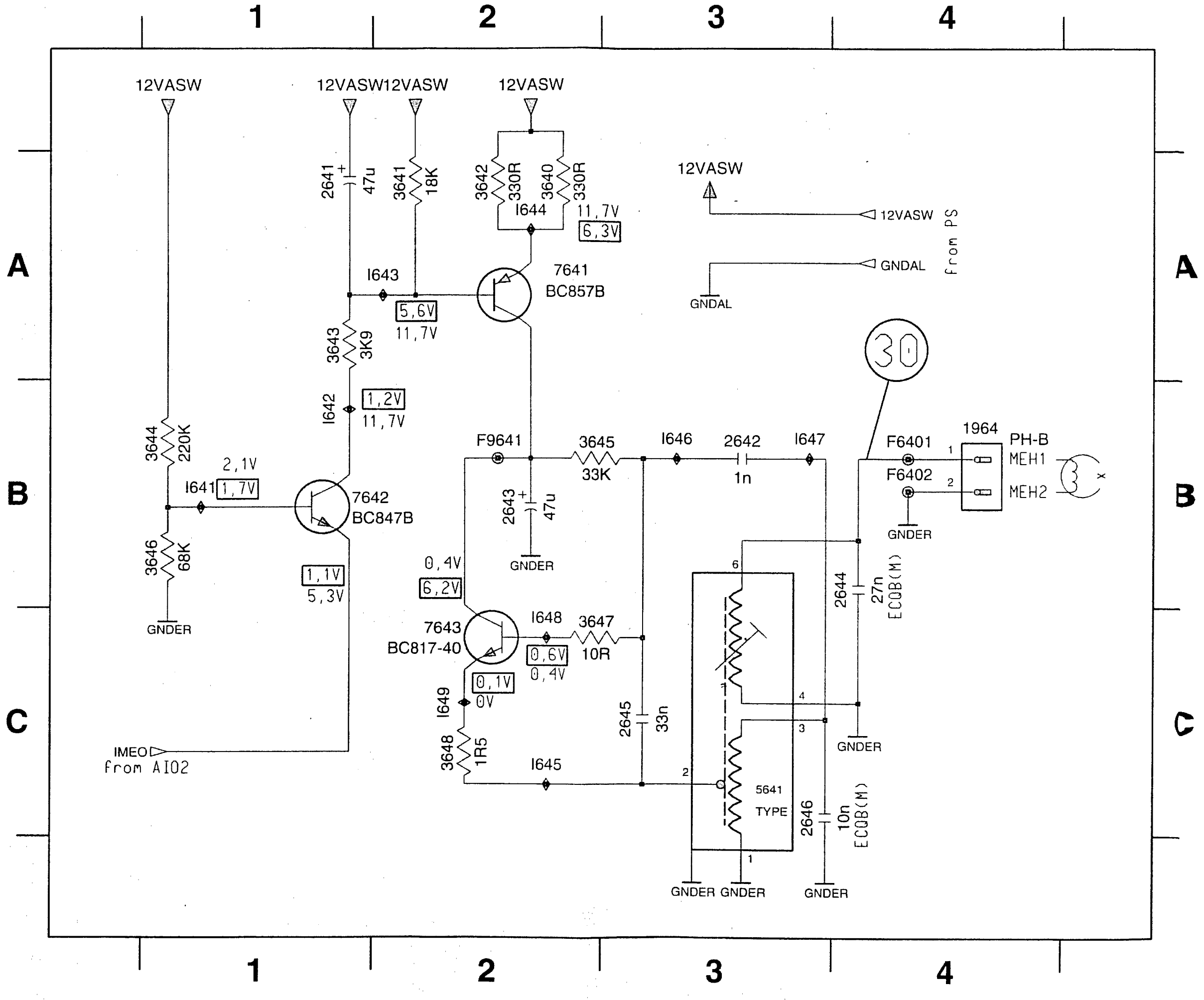
A: DC, 10 V/Div, 5us/Div
Connector 1964 Pin 1

Interconnections **Manual Page**

AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35

Main Erase Oscillator (ER)

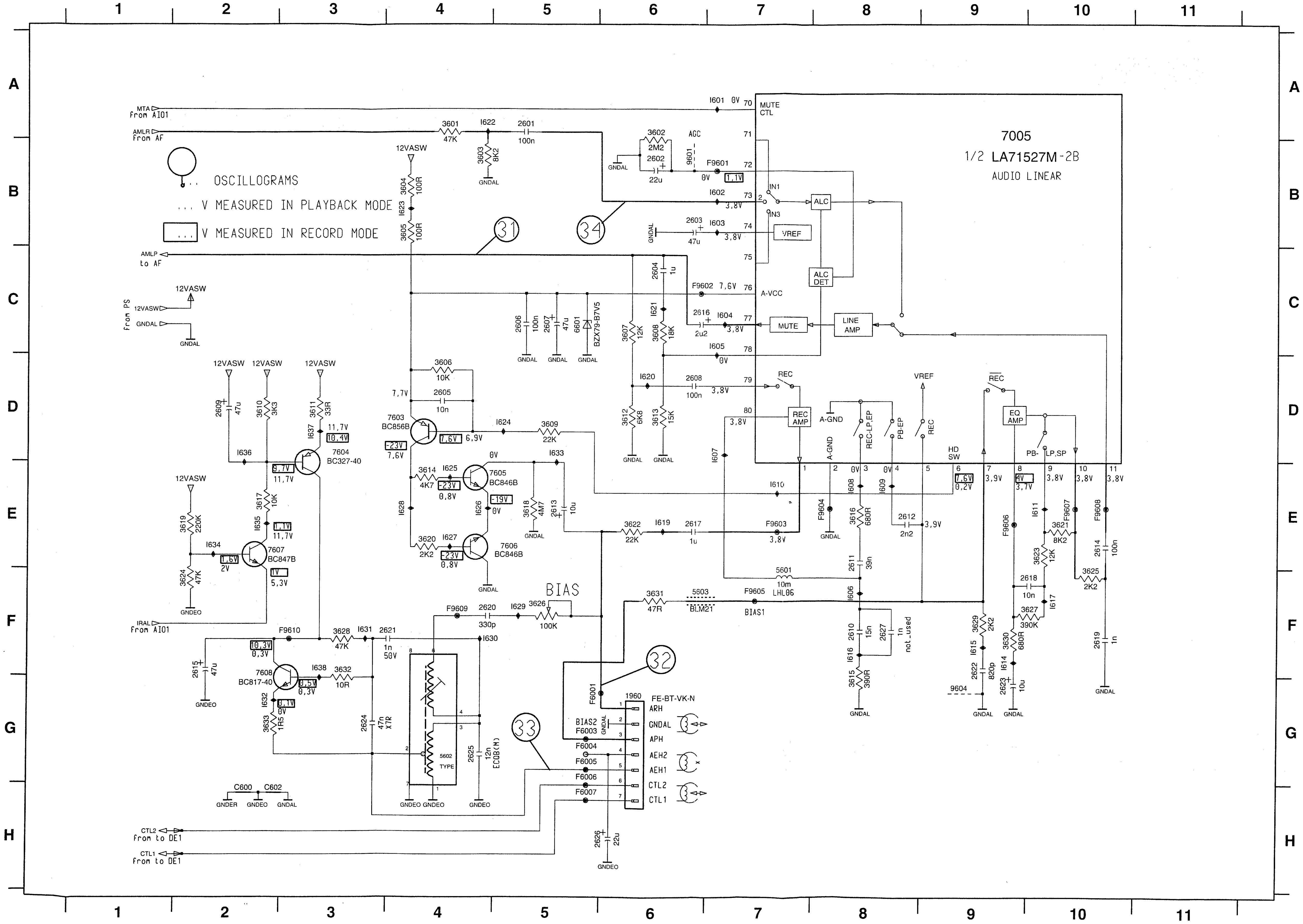
1964 B4	2643 B2	2646 C3	3642 A2	3645 B2	3648 C2	7642 B1	F6402 B4	I642 B1	I645 C2	I648 C2
2641 A1	2644 B4	3640 A2	3643 A1	3646 B1	5641 C3	7643 C2	F9641 B2	I643 A2	I646 B3	I649 C2
2642 B3	2645 C3	3641 A2	3644 B1	3647 C2	7641 A2	F6401 B4	I641 B1	I644 A2	I647 B3	


1
2
3
4
A
B
C
12VASW
12VASW12VASW
12VASW
2641
47u
3641
18K
3642
330R
3640
330R
I644
11,7V
6,3V
12VASW
12VASW
GNDAL
From PS
GNDAL
I643
5,6V
11,7V
7641
BC857B
㉚
3643
3K9
3642
1,2V
11,7V
3644
220K
2,1V
I641
1,7V
7642
BC847B
F9641
3645
33K
I646
2642
1n
I647
F6401
F6402
1964
PH-B
MEH1
MEH2
GNDER
2643
47u
GNDER
3646
68K
GNDER
1,1V
5,3V
0,4V
6,2V
7643
BC817-40
I648
3647
10R
0,6V
0,4V
0,1V
0V
2644
27n
ECOB(M)
I649
2645
33n
GNDER
IMEO
From AI02
3648
1R5
I645
5641
TYPE
2646
10n
ECOB(M)
GNDER GNDER
GNDER

Audio Linear (AL)

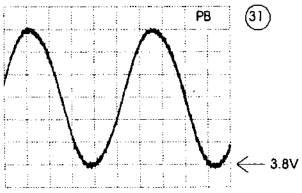
Interconnections Manual Page

AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35

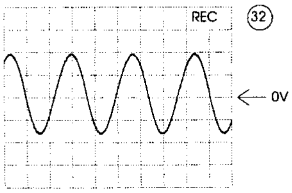

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
MTA
From AIO1
AMLR
From AF
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
AMLP
to AF
12VASW
From PS
12VASW
GNDAL
3601 47K
1622
2601 100n
3603 8K2
3604 100R
1623
3605 100R
3602 2M2
2602 22u
AGC
9601
F9601
0V
1,1V
1602
3,8V
1601 0V
2603 47u
1603
3,8V
2604 1u
F9602 7,6V
A-VCC
2616 2u2
1604
3,8V
1605
0V
2606 100n
2607 47u
6601 BZX79-B7V5
3607 12K
1621
3608 18K
1620
2608 100n
3,8V
3612 6K8
3613 15K
7005
1/2 LA71527M-2B
AUDIO LINEAR
MUTE CTL
IN1
IN3
ALC
VREF
ALC DET
MUTE
LINE AMP
REC
REC AMP
A-GND
REC-LP,EP
PB-EP
VREF
REC
HD SW
REC
EQ AMP
PB-
LP,SP
70
71
72
73
74
75
76
77
78
79
80
1
2
3
4
5
6
7
8
9
10
11
31
34
32
33
3606 10K
7,7V
2605 10n
7603 BC856B
-23V
7,6V
7,6V 6,9V
1624
3609 22K
3610 3K3
3611 33R
2609 47u
1637
11,7V
10,4V
7604 BC327-40
1636
9,7V
11,7V
3614 4K7
1625
-23V
0,8V
7605 BC846B
0V
-19V
0V
1633
1628
1626
3618 4M7
2613 10u
3620 2K2
1627
-23V
0,8V
7606 BC846B
3619 220K
3617 10K
1635
1,1V
11,7V
1634
1,6V
2V
7607 BC847B
1V
5,3V
3624 47K
GNDEO
IRAL
From AIO1
3622 22K
1619
2617 1u
F9603
3,8V
1607
1610
1608
1609
0V
0V
7,6V
0,2V
3,9V
4V
3,7V
3,8V
3,8V
3,8V
F9604
3616 680R
2612 2n2
3,9V
2611 39n
5601 10m LHL06
1606
2610 15n
2627 1n not_used
1616
3615 390R
F9606
1611
F9607
3621 8K2
3623 12K
F9608
2614 100n
3625 2K2
2618 10n
1617
3627 390K
3629 2K2
1615
2622 820p
3630 680R
1614
2623 10u
9604
2619 1n
BIAS
3631 47R
5603 BLM21
F9605
BIAS1
F9609
2620 330p
1629
3626 100K
F9610
3628 47K
1631
2621 1n 50V
1630
10,3V
0,3V
7608 BC817-40
1638
3632 10R
0,5V
0,3V
0,1V
0V
1632
3633 1R5
2615 47u
2624 47n X7R
5602 TYPE
2625 12n ECO8(M)
F6001
1960
FE-BT-VK-N
ARH
GNDAL
APH
AEH2
AEH1
CTL2
CTL1
BIAS2
F6003
F6004
F6005
F6006
F6007
C600
C602
GNDER
GNDEO
GNDAL
CTL2
From to DE1
CTL1
From to DE1
2626 22u

1960	G6
2601	A5
2602	B6
2603	B6
2604	C6
2605	D4
2606	C5
2607	C5
2608	D6
2609	D2
2610	F8
2611	E8
2612	E8
2613	E5
2614	E10
2615	F2
2616	C6
2617	E6
2618	F10
2619	F10
2620	F4
2621	F4
2622	F9
2623	G9
2624	G3
2625	G4
2626	H6
2627	F8
3601	A4
3602	A6
3603	B4
3604	B4
3605	B4
3606	D4
3607	C6
3608	C6
3609	D5
3610	D2
3611	D3
3612	D6
3613	D6
3614	E4
3615	G8
3616	E8
3617	E2
3618	E5
3619	E2
3620	E4
3621	E10
3622	E6
3623	E10
3624	F2
3625	F10
3626	F5
3627	F10
3628	F3
3629	F9
3630	F9
3631	F6
3632	F3
3633	G2
5601	F7
5602	G4
5603	F6
6601	C5
7005	B9
7603	D4
7604	D3
7605	E4
7606	E5
7607	E2
7608	F2
9601	B6
9604	G9
C600	H2
C602	H2
F6001	G5
F6003	G5
F6004	G5
F6005	G5
F6006	G5
F6007	H5
F9601	B7
F9602	C6
F9603	E7
F9604	E8
F9605	F7
F9606	E9
F9607	E10
F9608	E10
F9609	F4
F9610	F3
1601	A7
1602	B7
1603	B7
1604	C7
1605	C7
1606	F8
1607	D7
1608	E8
1609	E8
1610	E7
1611	E10
1614	F9
1615	F9
1616	F8
1617	F10
1619	E6
1620	D6
1621	C6
1622	A4
1623	B4
1624	D5
1625	E4
1626	E4
1627	E4
1628	E4
1629	F5
1630	F4
1631	F3
1632	G2
1633	D5
1634	E2
1635	E2
1636	D2
1637	D3
1638	F3

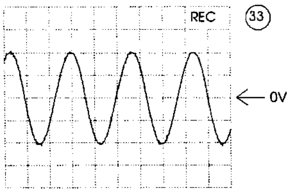
Oscillograms Audio Linear



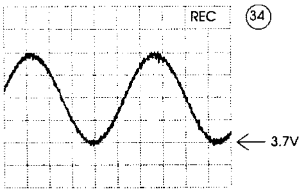
A: AC, 100mV/Div, 200us/Div
IC 7005 Pin 77



A: DC, 20 V/Div, 5us/Div
Connector 1960 Pin 1

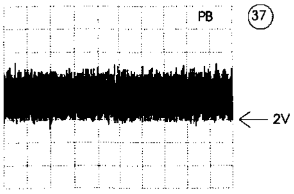


A: DC, 5 V/Div, 5us/Div
Connector 1960 Pin 5

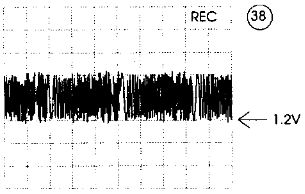


A: AC, 50mV/Div, 200us/Div
IC 7005 Pin 73

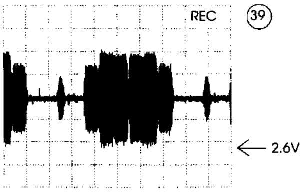
Oscillograms Video Signal Processing



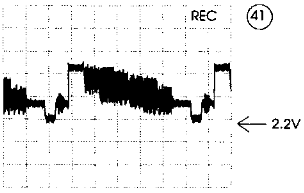
A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



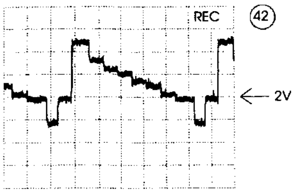
A: AC, 200mV/Div, 20us/Div
FMRV



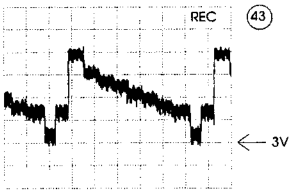
A: AC, 100mV/Div, 10us/Div
CPRV



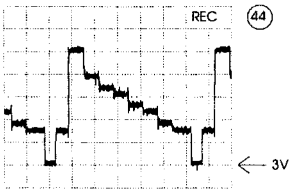
A: AC, 500mV/Div, 10us/Div
IC 7005 Pin 35



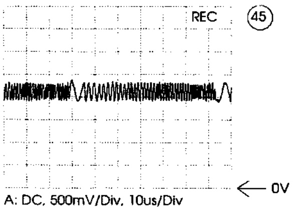
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 42



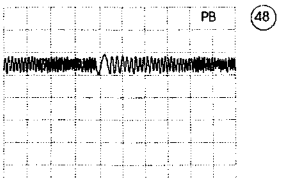
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 40



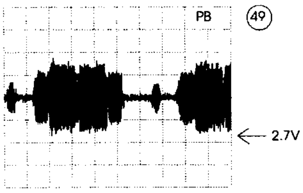
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 26



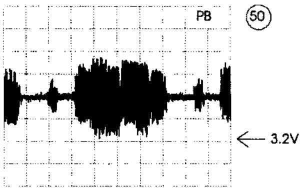
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 18



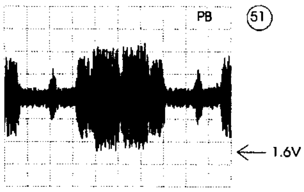
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 20



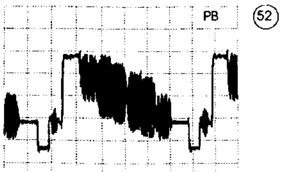
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 48/50



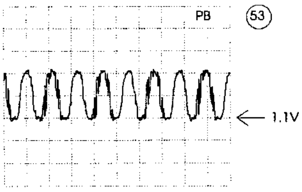
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 52



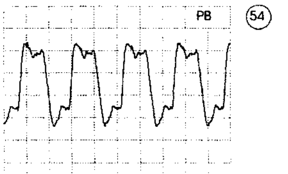
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 45



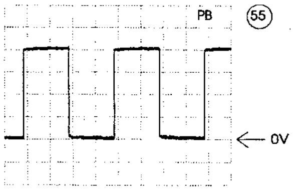
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 35



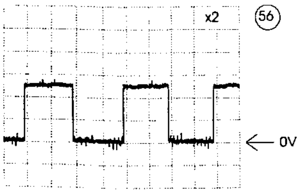
A: AC, 200mV/Div, 100ns/Div
IC 7005 Pin 58



A: DC, 200mV/Div, 100ns/Div
IC 7003 Pin 10



A: DC, 200mV/Div, 10ms/Div
IC 7005 Pin 66

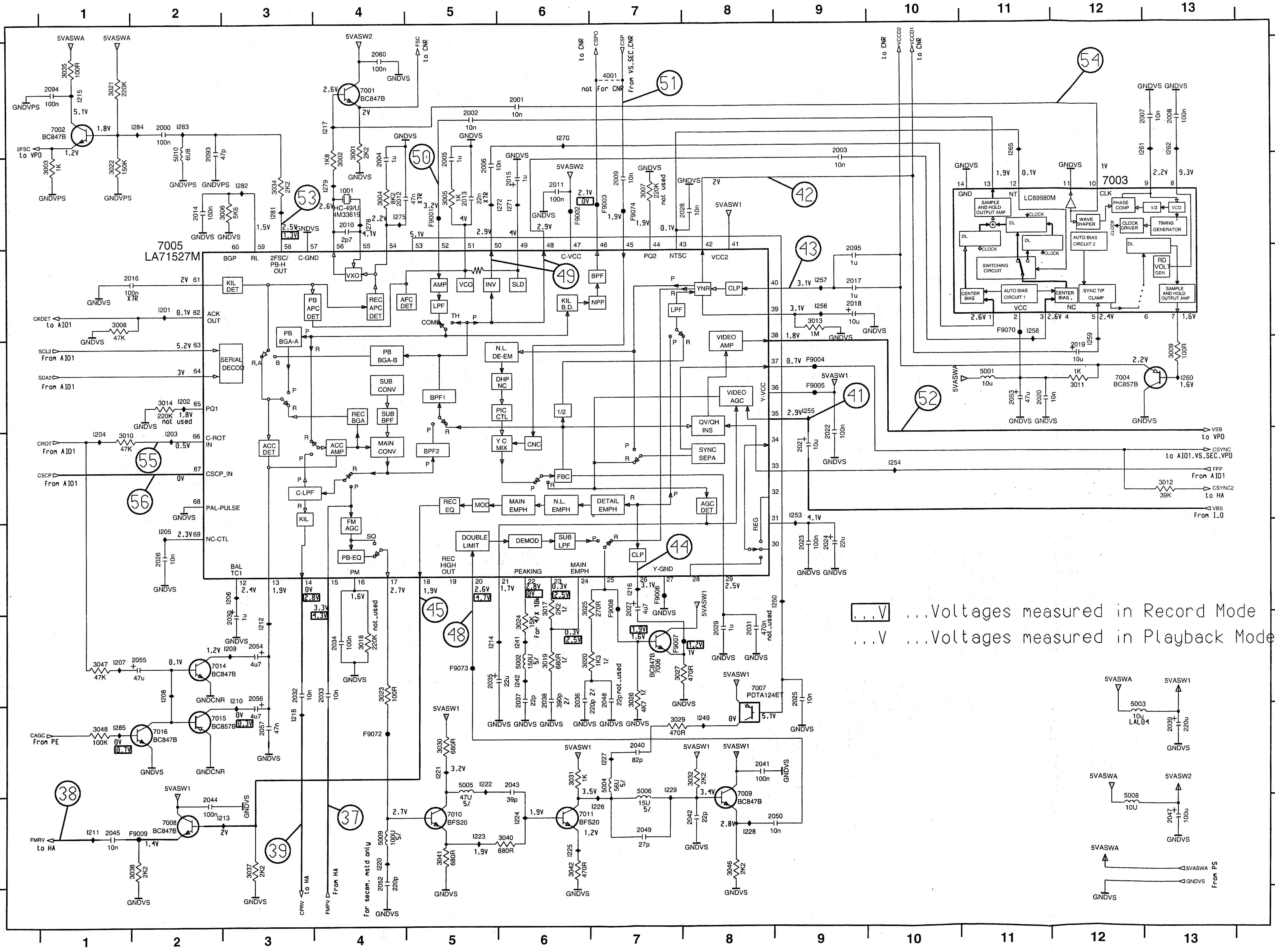


A: DC, 500mV/Div, 10ms/Div
IC 7005 Pin 67

Video Signal Processing (VS)

Interconnections Manual Page

AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35

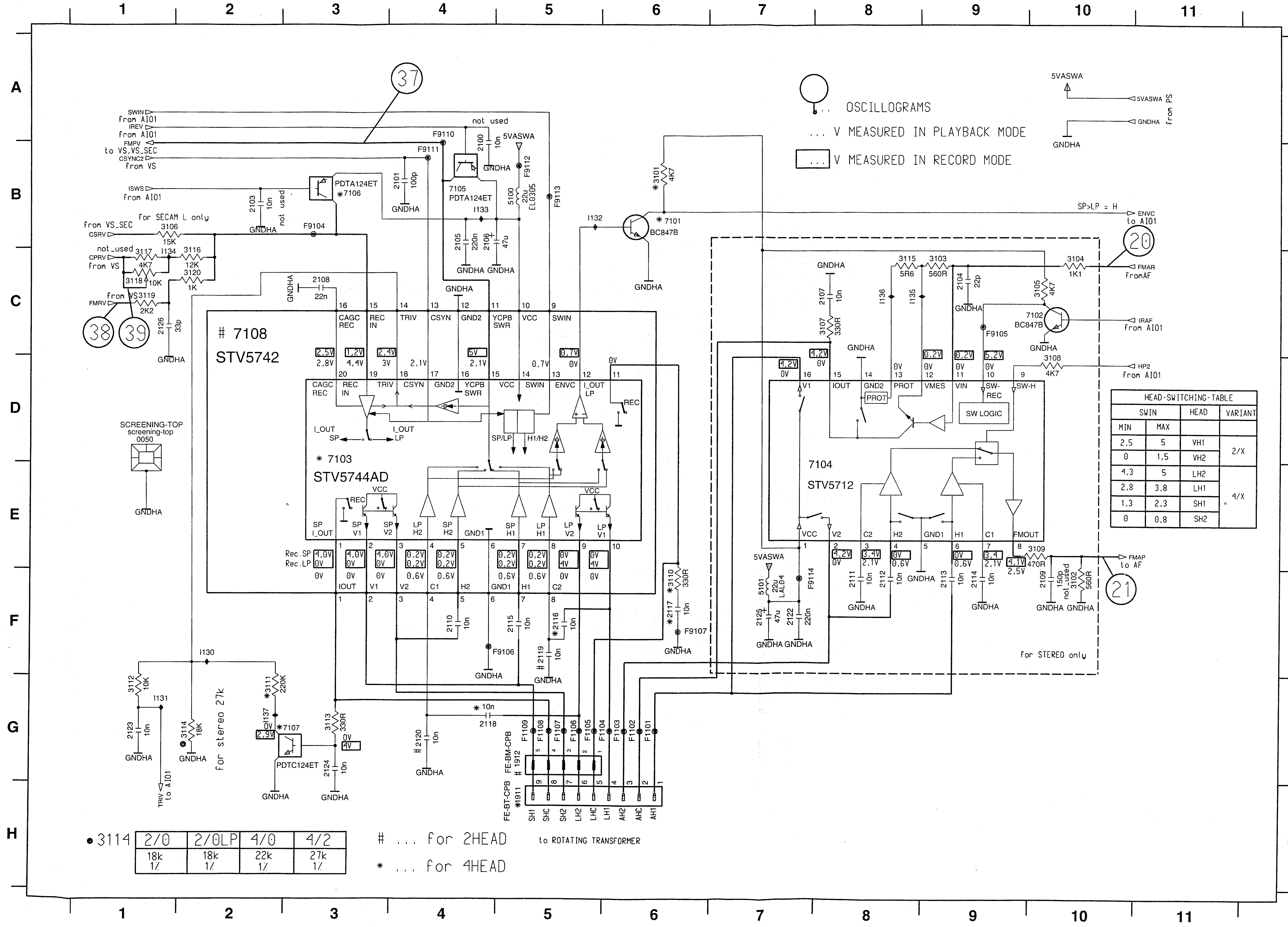

7005
LA71527M
7003
LC89980M
5VASWA
5VASW1
5VASW2
GNDVS
GNDVPS
2FSC to VPO
to CNR
CSPO
CSP
from VS_SEC,CNR
not for CNR
VCCD2
VCCD1
CKDET to AIO1
SCL2 from AIO1
SDA2 from AIO1
CROT from AIO1
CSCP from AIO1
CAGC from PE
FMRV to HA
CPRV to HA
FMPV from HA
VSB to VPO
CSYNC to AIO1,VS_SEC,VPO
FFP from AIO1
CSYNC2 to HA
VBS from I_O
5VASWA GNDVS from PS
For secam, mstd only
BGP
RL
2FSC/PB-H OUT
C-GND
C-VCC
PQ2
NTSC
VCC2
KIL DET
ACK OUT
SERIAL DECOD
PQ1
C-ROT IN
CSCP_IN
PAL-PULSE
NC-CTL
BAL TC1
PM
REC HIGH OUT
PEAKING
MAIN EMPH
Y-GND
Y-VCC
VXO
PB APC DET
REC APC DET
AFC DET
AMP
LPF
VCO
INV
SLD
BPF
NPP
KIL B.D.
YNR
CLP
VIDEO AMP
VIDEO AGC
QV/QH INS
SYNC SEPA
AGC DET
REG
PB BGA-A
PB BGA-B
SUB CONV
SUB BPF
REC BGA
MAIN CONV
ACC DET
ACC AMP
C-LPF
KIL
FM AGC
PB-EQ
BPF1
BPF2
N.L. DE-EM
DHP NC
PIC CTL
Y C MIX
CNC
1/2
FBC
REC EQ
MOD
MAIN EMPH
N.L. EMPH
DETAIL EMPH
DOUBLE LIMIT
DEMOD
SUB LPF
CLP
COMB
TH
SAMPLE AND HOLD OUTPUT AMP
WAVE SHAPER
PHASE COMP
1/3
VCO
CLOCK DRIVER
TIMING GENERATOR
AUTO BIAS CIRCUIT 2
SWITCHING CIRCUIT
RD VOLT GEN
CENTER BIAS
AUTO BIAS CIRCUIT 1
SYNC TIP CLAMP
SAMPLE AND HOLD OUTPUT AMP
DL
CLOCK
VCC
NC
GND
NT
CLK
7001 BC847B
7002 BC847B
7004 BC857B
7006 BC847B
7007 PDTA124ET
7008 BC847B
7009 BC847B
7010 BFS20
7011 BFS20
7014 BC847B
7015 BC857B
7016 BC847B
1001 HC-49/U 4M33619
(37)
(38)
(39)
(41)
(42)
(43)
(44)
(45)
(48)
(49)
(50)
(51)
(52)
(53)
(54)
(55)
(56)
1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I

[...V] ...Voltages measured in Record Mode

...V ...Voltages measured in Playback Mode

1001	B4
2000	A2
2001	A6
2002	A5
2003	A9
2004	B4
2005	B5
2006	B5
2007	A13
2008	A13
2009	B7
2010	B4
2011	B6
2012	B4
2013	B5
2014	B2
2015	B6
2016	C1
2017	C9
2018	C9
2019	D12
2020	D11
2021	E9
2022	E9
2023	F9
2024	F9
2025	G9
2026	F2
2027	F7
2028	B8
2029	G8
2030	G3
2031	G8
2032	G3
2033	G4
2034	G4
2035	G5
2036	G6
2037	G6
2038	G6
2039	H13
2040	H7
2041	H8
2042	I8
2043	H6
2044	I2
2045	I1
2047	I13
2048	G7
2049	I7
2050	I8
2052	I4
2053	D11
2054	G3
2055	G2
2056	G3
2057	H3
2060	A4
2093	A2
2094	A1
2095	C9
3001	A4
3002	B4
3003	B1
3004	B4
3005	B5
3006	B3
3007	B7
3008	C1
3009	D13
3010	E1
3011	D12
3012	E13
3013	C9
3014	D2
3017	F6
3018	G4
3019	G6
3020	G6
3021	A1
3022	B1
3023	G4
3024	G6
3025	F6
3026	G7
3027	G7
3029	H7
3030	H5
3031	H6
3032	H8
3034	B3
3035	A1
3037	I3
3038	I2
3040	I6
3041	I5
3042	I6
3046	I8
3047	G1
3048	H1
4001	A7
5001	D11
5002	G6
5003	H12
5004	H7
5005	H5
5006	H7
5008	I12
5009	I4
5010	A2
7001	A4
7002	A1
7003	B12
7004	D12
7005	B2
7006	G7
7007	G8
7008	I2
7009	I8
7010	I5
7011	I6
7014	G2
7015	H2
7016	H2
F9001	B5
F9002	B6
F9003	B7
F9004	D9
F9005	D9
F9006	F7
F9007	G7
F9008	F7
F9009	I2
F9070	C11
F9072	H4
F9073	G5
F9074	B7
I201	C2
I202	D2
I203	E2
I204	E1
I205	F2
I206	F3
I207	G1
I208	G2
I209	G3
I210	G3
I211	I1
I212	G3
I213	I2
I214	G5
I215	A1
I216	F7
I217	A4
I218	H3
I220	I4
I221	H5
I222	H5
I223	I5
I224	I6
I225	I6
I226	I7
I227	H7
I228	I8
I229	H7
I241	G6
I242	G6
I249	H8
I250	F8
I253	E9
I254	E10
I255	D9
I256	C9
I257	C9
I258	C11
I259	D12
I260	D13
I261	A12
I262	A13
I265	A11
I270	A6
I271	B6
I272	B6
I275	B4
I278	B4
I279	B4
I281	B3
I282	B3
I283	A2
I284	A2
I285	H1

Head Amplifier (HA)


1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H
37
38
39
20
21
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
SWIN from AI01
IREV from AI01
FMPV to VS,VS_SEC
CSYNC2 from VS
ISWS from AI01
for SECAM L only
from VS_SEC CSRV
3106 15K
not_used 3117 4K7
I134
3116 12K
3120 1K
CPRV from VS
3118 10K
from VS 3119 2K2
FMRV
2126 33p
GNDHA
PDTA124ET *7106
2103 10n not used
F9104
2108 22n
not used
F9110
F9111
2100 10n
5VASWA
2101 100p
7105 PDTA124ET
I133
F9112
5100 22u EL0305
F9113
2105 220n
2106 47u
I132
*3101 4K7
*7101 BC847B
SP>LP = H
ENVC to AI01
# 7108
STV5742
CAGC REC
REC IN
TRIV
CSYN
GND2
YCPB SWR
VCC
SWIN
ENVC
I_OUT LP
REC
* 7103
STV5744AD
I_OUT SP
I_OUT LP
SP/LP
H1/H2
VCC
SP I_OUT
SP V1
SP V2
LP H2
SP H2
GND1
SP H1
LP H1
LP V2
LP V1
Rec.SP
Rec.LP
IOUT V1 V2 C1 H2 GND1 H1 C2
2,5V 2,8V
1,2V 4,4V
2,4V 3V
2,1V
5V 2,1V
0,7V
0,7V 0V
0V
4,0V 0V
4,0V 0V
4,0V 0V
0,2V 0,2V 0,6V
0,2V 0,2V 0,6V
0,2V 0,2V 0,6V
0,2V 0,2V 0,6V
0V 4V 0V
0V 4V 0V
2110 10n
2115 10n
F9106
*2116 10n
#2119 10n
*2117 10n
*3110 330R
F9107
SCREENING-TOP screening-top 0050
I130
3112 10K
I131
2123 10n
3114 18K
for stereo 27k
*3111 220K
I137
*7107
2,9V
PDTC124ET
3113 330R
0V 4V
2124 10n
TRIV to AI01
*10n 2118
#2120 10n
F1109 F1108 F1107 F1106 F1105 F1104 F1103 F1102 F1101
FE-BM-CPB #1912
FE-BT-CPB *1911
SH1 SHC SH2 LH2 LHC LH1 AH2 AHC AH1
to ROTATING TRANSFORMER
5VASWA from PS
GNDHA
3115 5R6
3103 560R
2104 22p
3104 1K1
FMAR from AF
3105 4K7
7102 BC847B
IRAF from AI01
2107 10n
3107 330R
I136
I135
F9105
3108 4K7
HP2 from AI01
7104
STV5712
V1 IOUT GND2 PROT VMES VIN SW-REC SW-H
PROT
SW LOGIC
VCC V2 C2 H2 GND1 H1 C1 FMOUT
4,2V 0V
4,2V 0V
0,2V 0V
0,2V 0V
5,2V 0V
4,2V 0V
3,4V 2,1V
0V 0,6V
0V 0,6V
3,4 2,1V
4,1V 2,5V
3109 470R
FMAP to AF
2109 150p
3102 not_used 560R
5VASWA
5101 22u LAL04
F9114
2125 47u
2122 220n
2111 10n
2112 10n
2113 10n
2114 10n
for STEREO only

HEAD-SWITCHING-TABLE			
SWIN		HEAD	VARIANT
MIN	MAX		
2,5	5	VH1	2/X
0	1,5	VH2	
4,3	5	LH2	4/X
2,8	3,8	LH1	
1,3	2,3	SH1	
0	0,8	SH2	

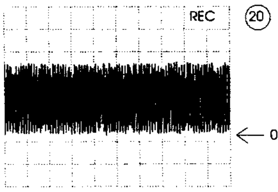
● 3114	2/0	2/0LP	4/0	4/2
	18k 1%	18k 1%	22k 1%	27k 1%

... for 2HEAD

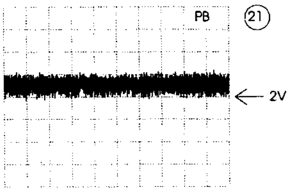
* ... for 4HEAD

0050	D1
1911	H5
1912	G5
2100	B4
2101	B4
2103	B2
2104	C9
2105	B4
2106	B4
2107	C8
2108	C3
2109	F10
2110	F4
2111	F8
2112	F8
2113	F9
2114	F9
2115	F5
2116	F5
2117	F6
2118	G4
2119	F5
2120	G4
2122	F7
2123	G1
2124	G3
2125	F7
2126	C1
3101	B6
3102	F10
3103	C9
3104	C10
3105	C10
3106	B1
3107	C8
3108	D10
3109	E10
3110	F6
3111	G2
3112	G1
3113	G3
3114	G2
3115	C8
3116	C2
3117	C1
3118	C1
3119	C1
3120	C2
5100	B5
5101	F7
7101	B6
7102	C10
7103	E3
7104	E7
7105	B4
7106	B3
7107	G3
7108	C2
F1101	G6
F1102	G6
F1103	G6
F1104	G6
F1105	G5
F1106	G5
F1107	G5
F1108	G5
F1109	G5
F9104	B3
F9105	C9
F9106	F5
F9107	F6
F9110	A4
F9111	B4
F9112	B5
F9113	B5
F9114	F7
I130	F2
I131	G1
I132	B5
I133	B4
I134	C1
I135	C8
I136	C8
I137	G2

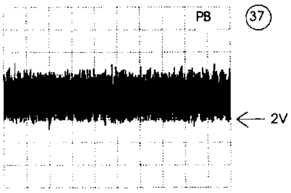
Oscillograms Head Amplifier



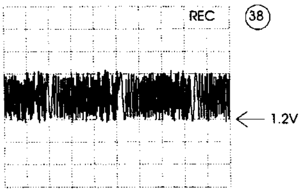
A: DC, 200mV/Div, 5ms/Div
FMAR



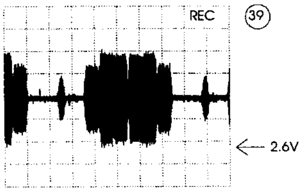
A: AC, 200mV/Div, 500us/Div
FMAP



A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



A: AC, 200mV/Div, 20us/Div
FMRV

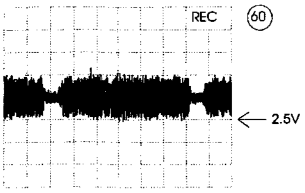


A: AC, 100mV/Div, 10us/Div
CPRV

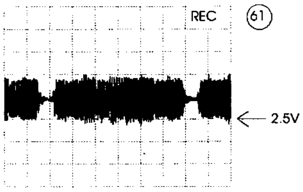
Interconnections Manual Page

AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35

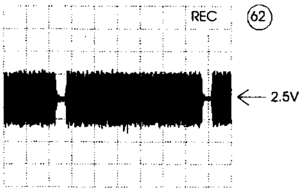
Oscillograms SECAM L Chroma Processing



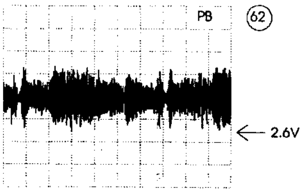
A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 29



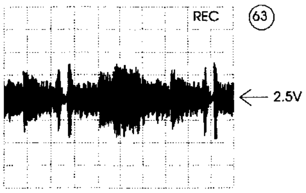
A: AC, 500mV/Div, 10us/Div
IC 7066 Pin 24



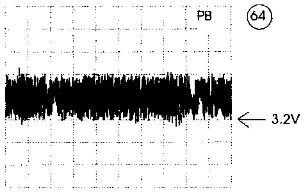
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 19



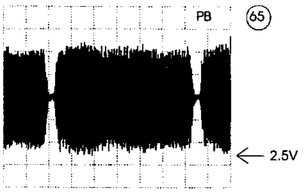
A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 19



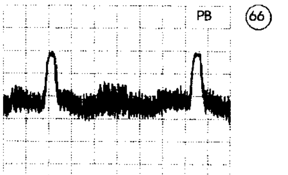
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 17



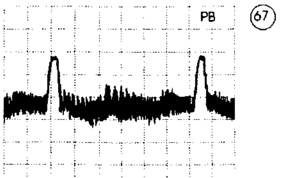
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 23



A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 8



A: DC, 500mV/Div, 10us/Div
IC 7066 Pin 32

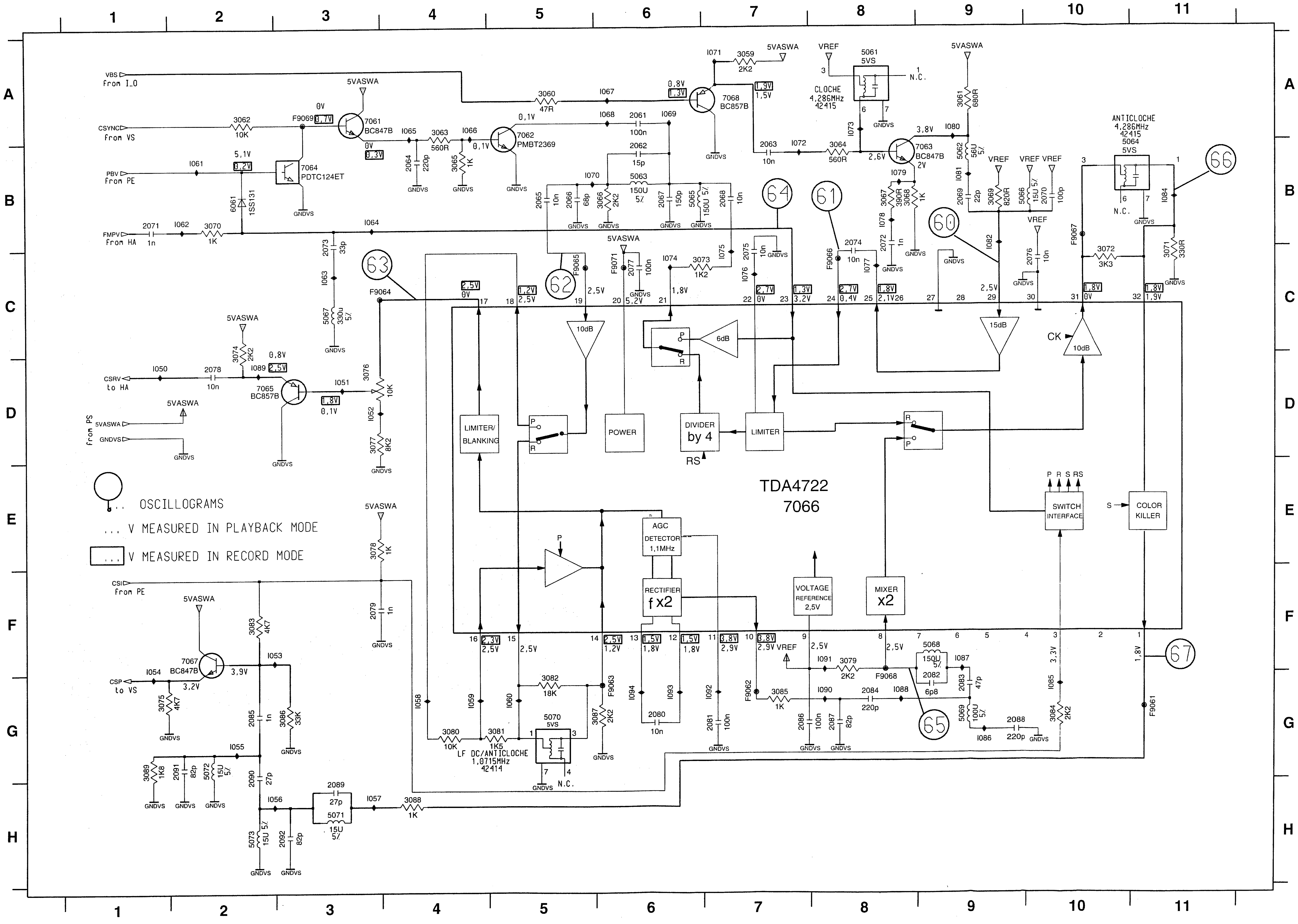


A: DC, 500mV/Div, 10us/Div
IC 7066 Pin 1

Interconnections Manual Page

AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35

Chroma Processing SECAM L (VS_SECAM)

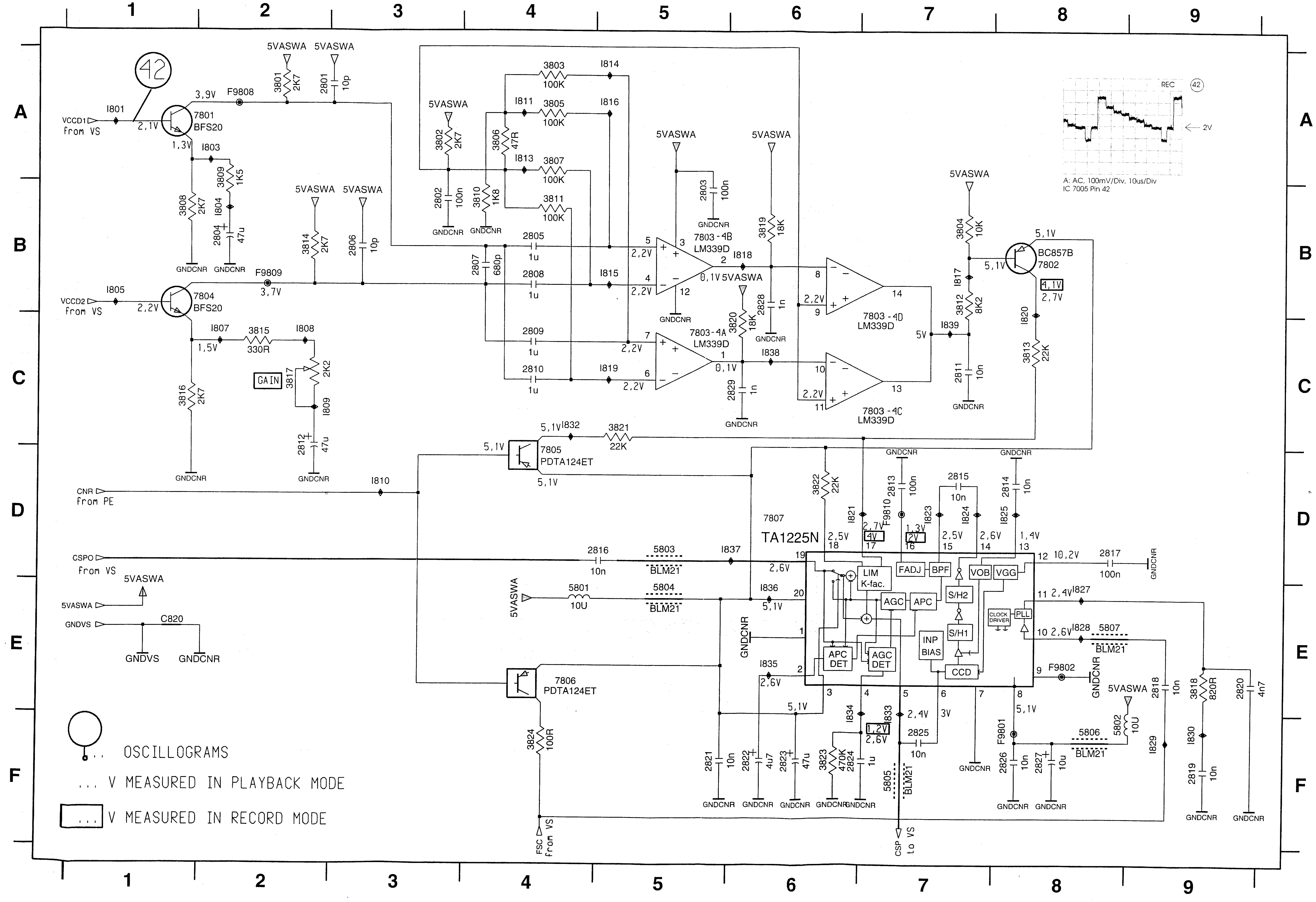

VBS from I_0
CSYNC from VS
PBV from PE
FMPV from HA
CSRV to HA
from PS 5VASWA GNDVS
CSI from PE
CSP to VS
5VASWA
VREF
GNDVS
7061 BC847B
7062 PMBT2369
7063 BC847B
7064 PDTC124ET
7065 BC857B
7067 BC847B
7068 BC857B
6061 1SS131
5061 5VS CLOCHE 4,286MHz 42415
5064 5VS ANTICLOCHE 4,286MHz 42415
5070 5VS LF DC/ANTICLOCHE 1,0715MHz 42414
N.C.
TDA4722 7066
LIMITER/ BLANKING
POWER
DIVIDER by 4
RS
LIMITER
10dB
6dB
15dB
CK
AGC DETECTOR 1,1MHz
RECTIFIER f x2
VOLTAGE REFERENCE 2,5V
MIXER x2
SWITCH INTERFACE
P R S RS
COLOR KILLER
S
P R
60
61
62
63
64
65
66
67
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H

0030	H1	I051	D3
2061	A6	I052	D3
2062	B6	I053	F2
2063	B7	I054	F1
2064	B4	I055	G2
2065	B5	I056	H2
2066	B5	I057	H3
2067	B6	I058	G4
2068	B7	I059	G4
2069	B9	I060	G5
2070	B10	I061	B2
2071	B1	I062	B2
2072	B8	I063	C3
2073	B3	I064	B3
2074	B8	I065	A4
2075	C7	I066	A4
2076	C10	I067	A6
2077	C6	I068	A6
2078	D2	I069	A6
2079	F3	I070	B5
2080	G6	I071	A7
2081	G7	I072	B7
2082	G9	I073	A8
2083	G9	I074	C6
2084	G8	I075	C7
2085	G2	I076	C7
2086	G7	I077	C8
2087	G8	I078	B8
2088	G9	I079	B8
2089	H3	I080	A9
2090	G2	I081	B9
2091	G2	I082	B9
2092	H3	I084	B11
3059	A7	I085	G10
3060	A5	I086	G9
3061	A9	I087	F9
3062	A2	I088	G8
3063	A4	I089	D2
3064	B8	I090	G8
3065	B4	I091	F8
3066	B6	I092	G7
3067	B8	I093	G6
3068	B8	I094	G6
3069	B9		
3070	B2		
3071	C11		
3072	C10		
3073	C6		
3074	C2		
3075	G1		
3076	D3		
3077	D3		
3078	E3		
3079	F8		
3080	G4		
3081	G5		
3082	G5		
3083	F2		
3084	G10		
3085	G7		
3086	G3		
3087	G6		
3088	H4		
3089	G1		
5061	A8		
5062	B9		
5063	B6		
5064	B10		
5065	B6		
5066	B9		
5067	C3		
5068	F9		
5069	G9		
5070	G5		
5071	H3		
5072	G2		
5073	H2		
6061	B2		
7061	A3		
7062	A5		
7063	B8		
7064	B3		
7065	D2		
7066	E7		
7067	F2		
7068	A7		
F9061	G11		
F9062	G7		
F9063	G6		
F9064	C3		
F9065	C5		
F9066	C8		
F9067	B10		
F9068	G8		
F9069	A3		
F9071	C6		
I050	D1		

Chroma Noise Reduction (CNR)

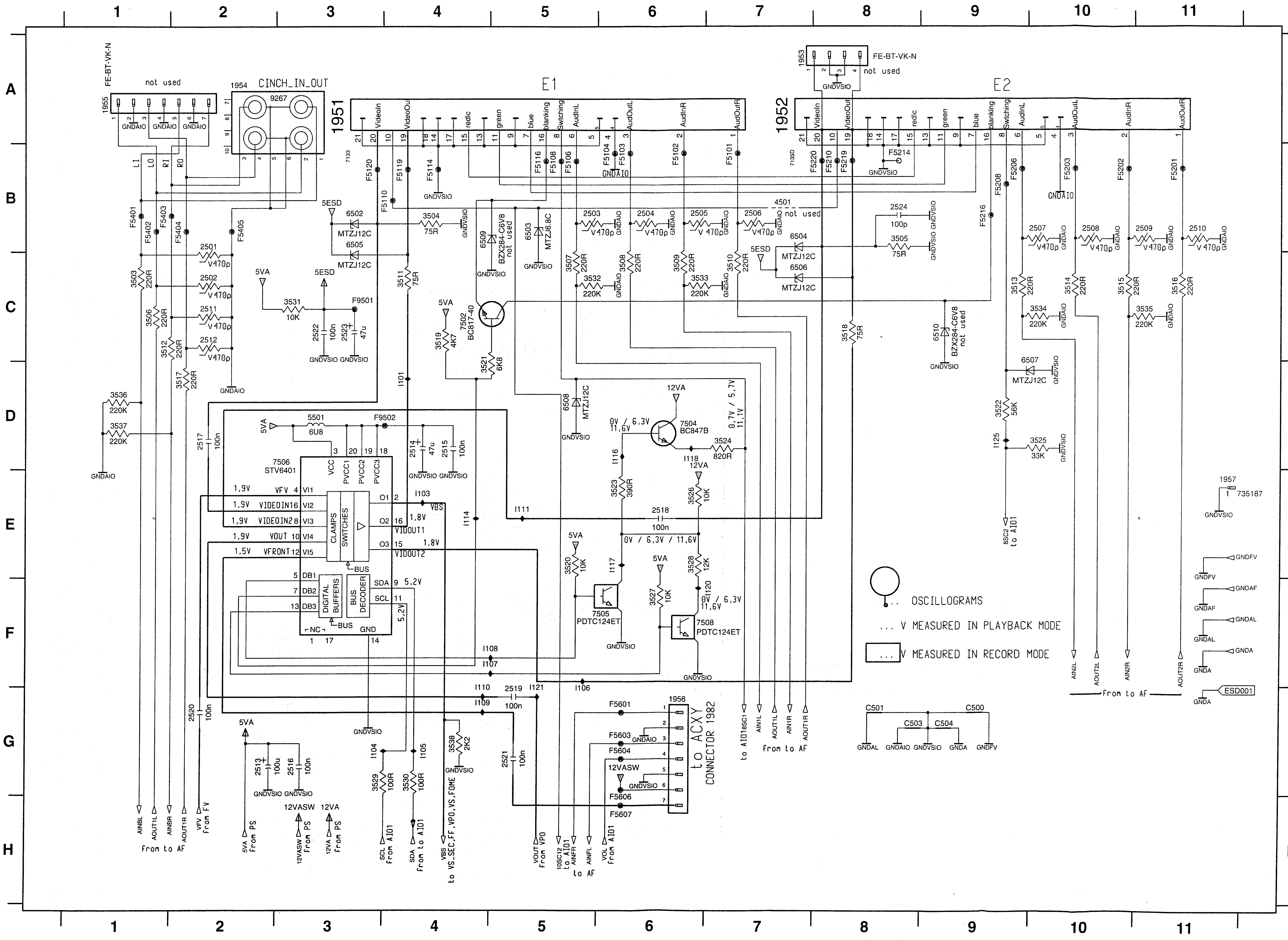
Interconnections Manual Page

AF	3-26	AIO2	3-41	CNR	3-36	DE	3-42	FF	3-43	FOME	3-44	HA	3-32	PE	3-40	QNIC	3-46	VS	3-31
AIO1	3-38	AL	3-28	DC	3-48	ER	3-27	FM_STEREO	3-25	FV	3-24	I_O	3-37	PS	3-22	VPO	3-45	VS_SEC	3-35


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
42
VCCD1
From VS
I801
2,1V
3,9V
F9808
7801
BFS20
1,3V
I803
3809
1K5
3808
2K7
I804
2804
47u
GNDCNR
5VASWA
3801
2K7
2801
10p
VCCD2
From VS
I805
2,2V
7804
BFS20
F9809
3,7V
I807
1,5V
3815
330R
I808
GAIN
3817
2K2
I809
2812
47u
3816
2K7
3814
2K7
2806
10p
3803
100K
I814
I811
3805
100K
I816
3802
2K7
3806
47R
I813
3807
100K
3811
100K
2802
100n
3810
1K8
2805
1u
2807
680p
2808
1u
I815
2809
1u
2810
1u
I819
2,2V
0,1V
7803-4B
LM339D
I818
7803-4A
LM339D
2803
100n
3819
18K
3820
18K
2828
1n
2829
1n
I838
7803-4D
LM339D
7803-4C
LM339D
5V
I839
2811
10n
3804
10K
I817
3812
8K2
BC857B
7802
5,1V
4,1V
2,7V
I820
3813
22K
REC
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 42
2V
5,1V
I832
3821
22K
7805
PDTA124ET
CNR
From PE
I810
CSPO
From VS
2816
10n
5803
BLM21
I837
5VASWA
GNDVS
C820
GNDVS
5801
10U
5804
BLM21
I836
7806
PDTA124ET
3824
100R
FSC
From VS
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
7807
TA1225N
3822
22K
I821
2813
100n
F9810
I823
2815
10n
I824
I825
2814
10n
2,5V
2,7V
4V
1,3V
2V
2,6V
1,4V
LIM
K-fac.
FADJ
BPF
VOB
VGG
AGC
APC
S/H2
S/H1
INP
BIAS
APC
DET
AGC
DET
CCD
CLOCK
DRIVER
PLL
2817
100n
10,2V
2,4V
I827
2,6V
I828
5807
BLM21
F9802
2818
10n
3818
820R
2820
4n7
I835
2,6V
I834
I833
1,2V
2,4V
3V
2825
10n
2821
10n
2822
4u7
2823
47u
3823
470K
2824
1u
5805
BLM21
CSP
to VS
F9801
2826
10n
2827
10u
5806
BLM21
5802
10U
I829
I830
2819
10n

2801	A2
2802	B3
2803	B5
2804	B2
2805	B4
2806	B3
2807	B4
2808	B4
2809	C4
2810	C4
2811	C7
2812	C2
2813	D7
2814	D8
2815	D7
2816	D5
2817	D8
2818	E9
2819	F9
2820	E9
2821	F5
2822	F6
2823	F6
2824	F6
2825	F7
2826	F8
2827	F8
2828	B6
2829	C6
3801	A2
3802	A3
3803	A4
3804	B7
3805	A4
3806	A4
3807	A4
3808	B1
3809	A2
3810	B4
3811	B4
3812	B7
3813	C8
3814	B2
3815	C2
3816	C1
3817	C2
3818	E9
3819	B6
3820	C6
3821	C5
3822	D6
3823	F6
3824	F4
5801	E4
5802	F8
5803	D5
5804	E5
5805	F7
5806	F8
5807	E8
7801	A1
7802	B8
7803	B5
7803	C5
7803	B7
7803	C7
7804	B1
7805	D4
7806	E4
7807	D6
C820	E1
F9801	F8
F9802	E8
F9808	A2
F9809	B2
F9810	D'
I801	A1
I803	A2
I804	B2
I805	B1
I807	C2
I808	C2
I809	C2
I810	D3
I811	A4
I813	A4
I814	A5
I815	B5
I816	A5
I817	B7
I818	B6
I819	C5
I820	B8
I821	D6
I823	D7
I824	D7
I825	D8
I827	E8
I828	E8
I829	F9
I830	F9
I832	C4
I833	E7
I834	E6
I835	E6
I836	E6
I837	D6
I838	C6
I839	C7

Input/Output (I_O)

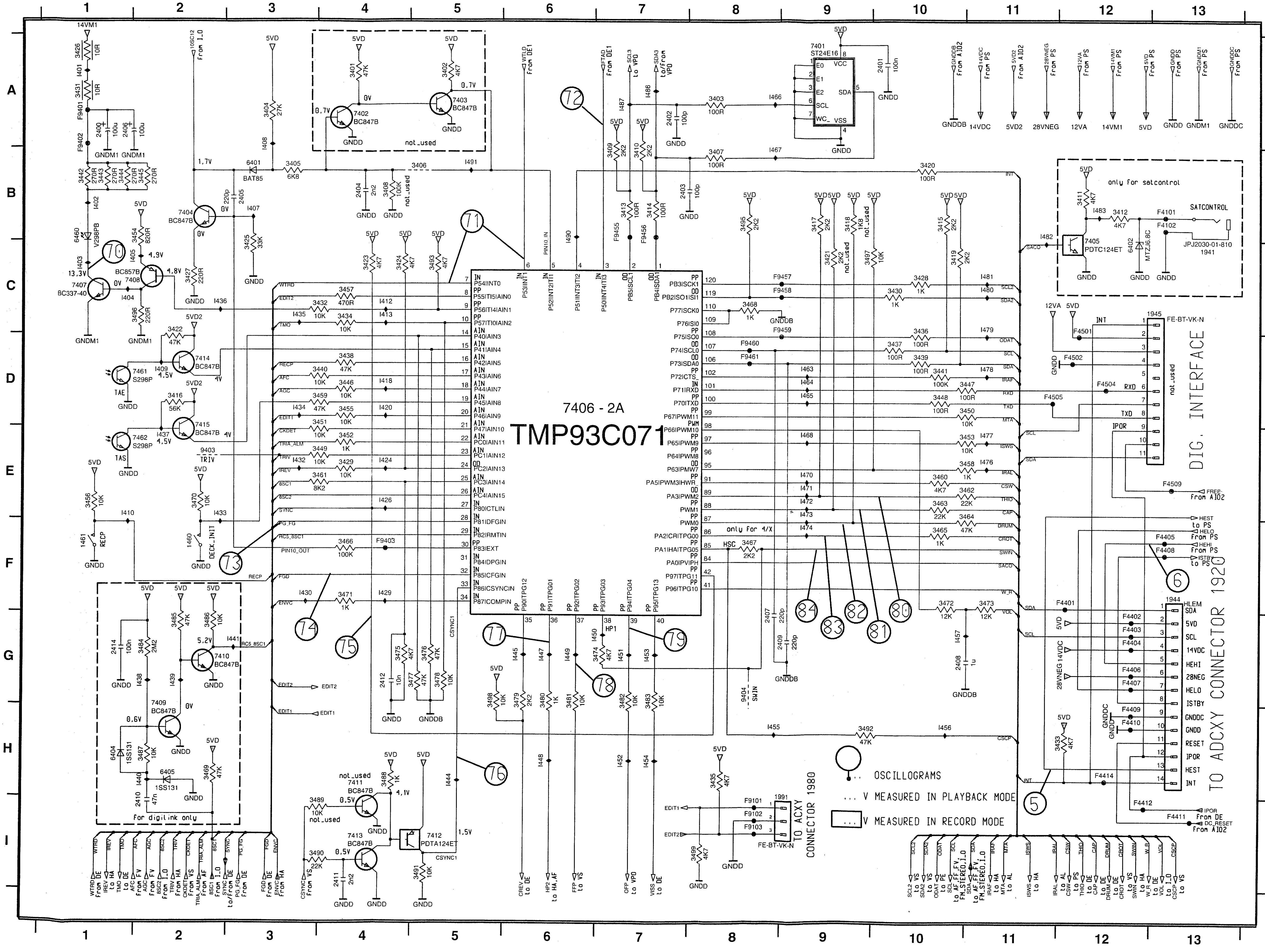

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
FE-BT-VK-N
not used
1955
1954 CINCH_IN_OUT
9267
1951
E1
1952
E2
1953
FE-BT-VK-N
not used
VideoIn
VideoOut
redic
green
blue
blanking
Switching
AudInL
AudOutL
AudInR
AudOutR
GNDAIO
GNDVSIO
L1
L0
RI
R0
F5401
F5402
F5403
F5404
F5405
2501 V470p
2502 V470p
2511 V470p
2512 V470p
3503 220R
3506 220R
3512 220R
3517 220R
3536 220K
3537 220K
5ESD
6502 MTZJ12C
6505 MTZJ12C
F5120
F5119
F5110
F5114
3504 75R
3511 75R
5VA
5ESD
3531 10K
F9501
2522 100n
2523 47u
6509 BZX284-C6V8 not used
6503 MTZJ6.8C
5VA
7502 BC817-40
3519 4K7
3521 6K8
F5116
F5108
F5106
F5104
F5103
GNDAIO
F5102
F5101
2503 V470p
2504 V470p
2505 V470p
2506 V470p
4501 not used
3507 220R
3508 220R
3509 220R
3510 220R
3532 220K
3533 220K
5ESD
6504 MTZJ12C
6506 MTZJ12C
3518 75R
2524 100p
3505 75R
F5214
F5220
F5210
F5219
F5216
F5208
F5206
F5203
F5202
F5201
6510 BZX284-C6V8 not used
2507 V470p
2508 V470p
2509 V470p
2510 V470p
3513 220R
3514 220R
3515 220R
3516 220R
3534 220K
3535 220K
6507 MTZJ12C
3522 56K
I125
3525 33K
8SC2 to AIO1
1957 735187
5501 6U8
F9502
2514 47u
2515 100n
2517 100n
7506 STV6401
VCC PVCC1 PVCC2 PVCC3
1,9V VFV 4 VI1
1,9V VIDEOIN1 6 VI2
1,9V VIDEOIN2 8 VI3
1,9V VOUT 10 VI4
1,5V VFRONT 12 VI5
CLAMPS SWITCHES
O1 2
O2 16 1,8V VIDOUT1
O3 15 1,8V VIDOUT2
I103 VBS
BUS
DB1 DB2 DB3
DIGITAL BUFFERS
BUS DECODER
SDA 9 5,2V
SCL 11
5,2V
NC
GND 14
I101
I114
I111
6508 MTZJ12C
12VA
0V / 6,3V 11,6V
7504 BC847B
0,7V / 5,7V 11,1V
3524 820R
I116
I118
12VA
3523 390R
3526 10K
2518 100n
0V / 6,3V / 11,6V
5VA
3520 10K
I117
5VA
3527 10K
3528 12K
I120
0V / 6,3V 11,6V
7505 PDTC124ET
7508 PDTC124ET
I108
I107
I110
2519 100n
I121
I106
I109
F5601
1956
F5603
F5604
12VASW
F5606
F5607
to ACXY CONNECTOR 1982
2520 100n
5VA
2513 100u
2516 100n
12VASW 12VA
I104
I105
3529 100R
3530 100R
3538 2K2
2521 100n
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
C501 C500
C503 C504
GNDAL GNDAIO GNDVSIO GNDA GNDFV
GNDFV
GNDAF
GNDAL
GNDA
ESD001
AINBL AOUT1L AINBR AOUT1R From to AF
VFV From FV
5VA From PS
12VASW From PS
12VA From PS
SCL From AIO1
SDA From to AIO1
VBS to VS_SEC,FF,VPO,VS,FOME
VOUT From VPO
18SC1 to AIO1
AINFR to AF
AINFL
VOL From AIO1
to AIO18SC1
AIN1L AOUT1L AIN1R AOUT1R From to AF
AIN2L AOUT2L AIN2R AOUT2R From to AF

1951	A3	F5119	B4
1952	A7	F5120	B3
1953	A7	F5201	B11
1954	A2	F5202	B1
1955	A1	F5203	B1
1956	G6	F5206	B9
1957	E11	F5208	B9
2501	B2	F5210	B8
2502	C2	F5214	B8
2503	B5	F5216	B9
2504	B6	F5219	B8
2505	B6	F5220	B8
2506	B7	F5401	B1
2507	B10	F5402	B1
2508	B10	F5403	B1
2509	B11	F5404	B2
2510	B11	F5405	B2
2511	C2	F5601	G6
2512	C2	F5603	G6
2513	G2	F5604	G6
2514	D4	F5606	G6
2515	D4	F5607	H6
2516	G3	F9501	C3
2517	D2	F9502	D4
2518	E6	I101	D4
2519	G5	I103	E4
2520	G2	I104	G3
2521	G5	I105	G4
2522	C3	I106	G5
2523	C3	I107	F5
2524	B8	I108	F5
3503	C1	I109	G4
3504	B4	I110	G4
3505	B8	I111	E5
3506	C1	I114	E4
3507	C5	I116	D6
3508	C6	I117	E6
3509	C6	I118	D6
3510	C7	I120	F7
3511	C4	I121	G5
3512	C1	I125	D9
3513	C9		
3514	C10		
3515	C10		
3516	C11		
3517	D2		
3518	C8		
3519	C4		
3520	E5		
3521	D4		
3522	D9		
3523	E6		
3524	D7		
3525	D10		
3526	E6		
3527	F6		
3528	E6		
3529	G3		
3530	G4		
3531	C3		
3532	C5		
3533	C6		
3534	C10		
3535	C11		
3536	D1		
3537	D1		
3538	G4		
4501	B7		
5501	D3		
6502	B3		
6503	B5		
6504	B7		
6505	B3		
6506	C7		
6507	D10		
6508	D5		
6509	B4		
6510	C9		
7502	C4		
7504	D6		
7505	F5		
7506	D2		
7508	F6		
C500	G9		
C501	G8		
C503	G8		
C504	G9		
ESD001	G11		
F5101	B7		
F5102	B6		
F5103	B6		
F5104	B6		
F5106	B5		
F5108	B5		
F5110	B4		
F5114	B4		
F5116	B5		

Central / Deck Control 1 (AIO1)

Interconnections Manual Page

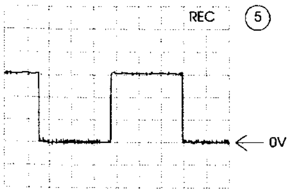
AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35



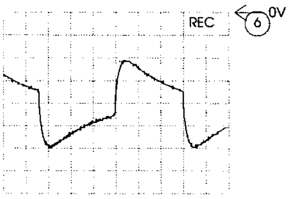
1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
7406 - 2A
TMP93C071
7401
ST24E16
VCC
SDA
SCL
VSS
E0
E1
E2
WC_
7402
BC847B
7403
BC847B
not_used
7404
BC847B
7405
PDTC124ET
7407
BC337-40
7408
BC857B
7409
BC847B
7410
BC847B
7411
BC847B
7412
PDTA124ET
7413
BC847B
7414
BC847B
7415
BC847B
7461
S298P
7462
S298P
TAE
TAS
6401
BAT85
6404
1SS131
6405
1SS131
6460
V298PB
14VM1
5VD
5VD2
GNDD
GNDM1
GNDDB
GNDDC
14VDC
28VNEG
12VA
only for satcontrol
SATCONTROL
JPJ2030-01-810
1941
FE-BT-VK-N
1945
DIG. INTERFACE
not_used
RXD
TXD
IPOR
INT
1944
HLEM
SDA
SCL
14VDC
HEHI
28NEG
HELO
ISTBY
GNDDC
GNDD
RESET
IPOR
HEST
INT
TO ADCXY CONNECTOR 1920
1991
FE-BT-VK-N
TO ACXY CONNECTOR 1980
EDIT1
EDIT2
only for 4/X
HSC
SWIN
DECK_INIT
RECP
for digilink only
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
5
6

0020	D1
0021	B1
0022	E1
0031	F1
1460	F2
1461	F1
1941	C13
1944	F13
1945	C12
1991	I8
2400	A1
2401	A10
2402	A7
2403	B7
2404	B4
2405	B3
2406	A1
2407	G8
2408	G10
2409	G9
2410	I2
2411	I4
2412	G4
2414	G1
3401	A4
3402	A5
3403	A8
3404	A3
3405	B3
3406	B5
3407	B8
3408	B4
3409	B7
3410	B7
3411	B12
3412	B12
3413	B7
3414	B7
3415	B10
3416	D2
3417	B9
3418	B9
3419	C10
3420	B10
3421	C9
3422	C2
3423	C4
3424	C4
3425	C3
3426	A1
3427	C2
3428	C10
3429	E4
3430	C10
3431	A1
3432	C4
3433	H12
3434	C4
3435	H8
3436	C10
3437	D10
3438	D4
3439	D10
3440	D4
3441	D10
3442	B1
3443	B1
3444	B1
3445	B2
3446	D4
3447	D11
3448	D10
3449	E4
3450	D11
3451	D4
3452	E4
3453	E11
3454	B2
3455	D4
3456	E1
3457	C4
3458	E11
3459	D4
3460	E10
3461	E4
3462	E11
3463	E10
3464	E11
3465	F10
3466	F4
3467	F8
3468	C8
3469	H2
3470	E2
3471	F4
3472	F10
3473	F11
3474	G7
3475	G4
3476	G5
3477	G5
3478	G5
3479	G6
3480	G6
3481	G6
3482	G7
3483	G7
3484	G2
3485	G2
3486	G2
3487	H2
3488	H4
3489	I3
3490	I3
3491	I5
3492	H9
3493	C5
3495	B8
3496	C2
3497	C9
3498	G5
3499	I8
6401	B3
6402	C12
6404	H1
6405	H2
6460	B1
7401	A9
7402	A4
7403	A5
7404	B2
7405	C12
7406	D6
7407	C1
7408	C2
7409	H2
7410	G2
7411	H4
7412	I5
7413	I4
7414	D2
7415	E2
7461	D1
7462	E1
9403	E2
9404	G8
F4101	B13
F4102	B13
F4401	F12
F4402	G12
F4403	G12
F4404	G12
F4405	F13
F4406	G12
F4407	G12
F4408	F13
F4409	H12
F4410	H12
F4411	I13
F4412	I12
F4414	H12
F4501	C12
F4502	D12
F4504	D12
F4505	D11
F4509	E13
F9101	I8
F9102	I8
F9103	I8
F9401	A1
F9402	A1
F9403	F4
F9455	B7
F9456	B7
F9457	C9
F9458	C9
F9459	C9
F9460	D8
F9461	D8
I401	A1
I402	B1
I403	C1
I404	C1
I405	C1
I407	B3
I408	A3
I409	D2
I410	E1
I412	C4
I413	C4
I418	D4
I420	D4
I424	E4
I426	E4
I429	F4
I430	F3
I432	E3
I433	E2
I434	D3
I435	C3
I436	C2
I437	E2
I438	G2
I439	G2
I440	H2
I441	G3
I444	H5
I445	G6
I447	G6
I448	H6
I449	G6
I450	G6
I451	G7
I452	H7
I453	G7
I454	H7
I455	H8
I456	H10
I457	G10
I463	D9
I464	D9
I465	D9
I466	A8
I467	B8
I468	E9
I470	E9
I471	E9
I472	E9
I473	E9
I474	F9
I476	E11
I477	E11
I478	D11
I479	C11
I480	C11
I481	C11
I482	B11
I483	B12
I486	A7
I487	A7
I490	B6
I491	B5

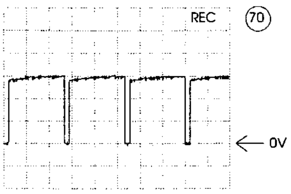
Oscillograms Central / Deck Control



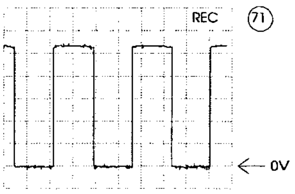
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13



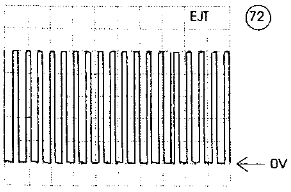
A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5



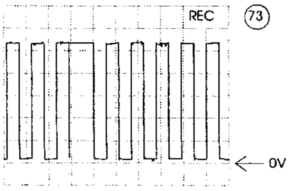
A: DC, 5 V/Div, 5ms/Div
Collector 7407



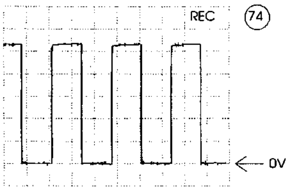
A: DC, 1 V/Div, 200ms/Div
IC 7406 Pin 6/7



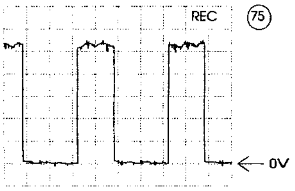
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



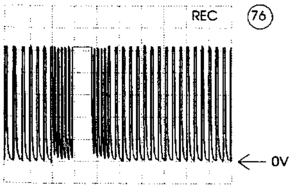
A: DC, 1 V/Div, 2ms/Div
IC 7406 Pin 28



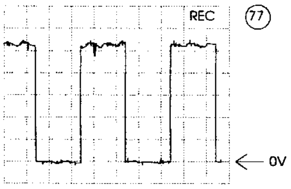
A: DC, 1 V/Div, 500us/Div
IC 7406 Pin 32



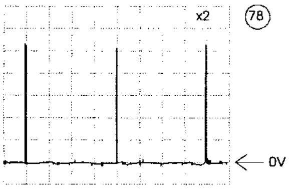
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 27/42



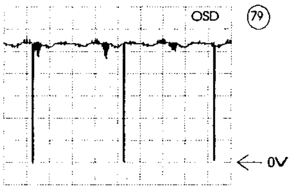
A: DC, 1 V/Div, 200us/Div
IC 7406 Pin 33



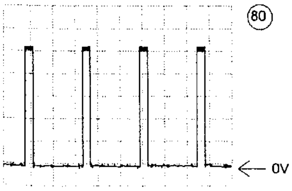
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 36



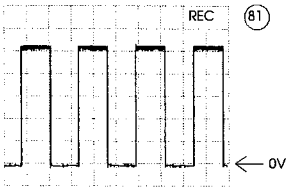
A: DC, 1 V/Div, 5ms/Div
IC 7406 Pin 37



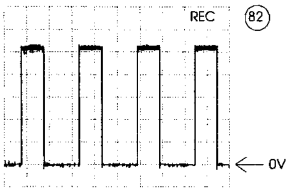
A: DC, 1 V/Div, 5ms/Div
IC 7406 Pin 39



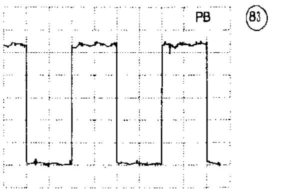
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 89



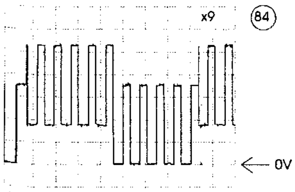
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 88



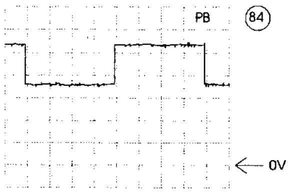
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 87



A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 86

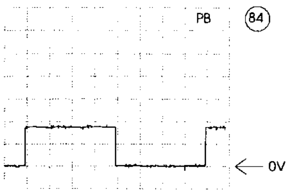


A: DC, 1 V/Div, 5ms/Div
SWIN



A: DC, 1 V/Div, 5ms/Div
SWIN

Longplay

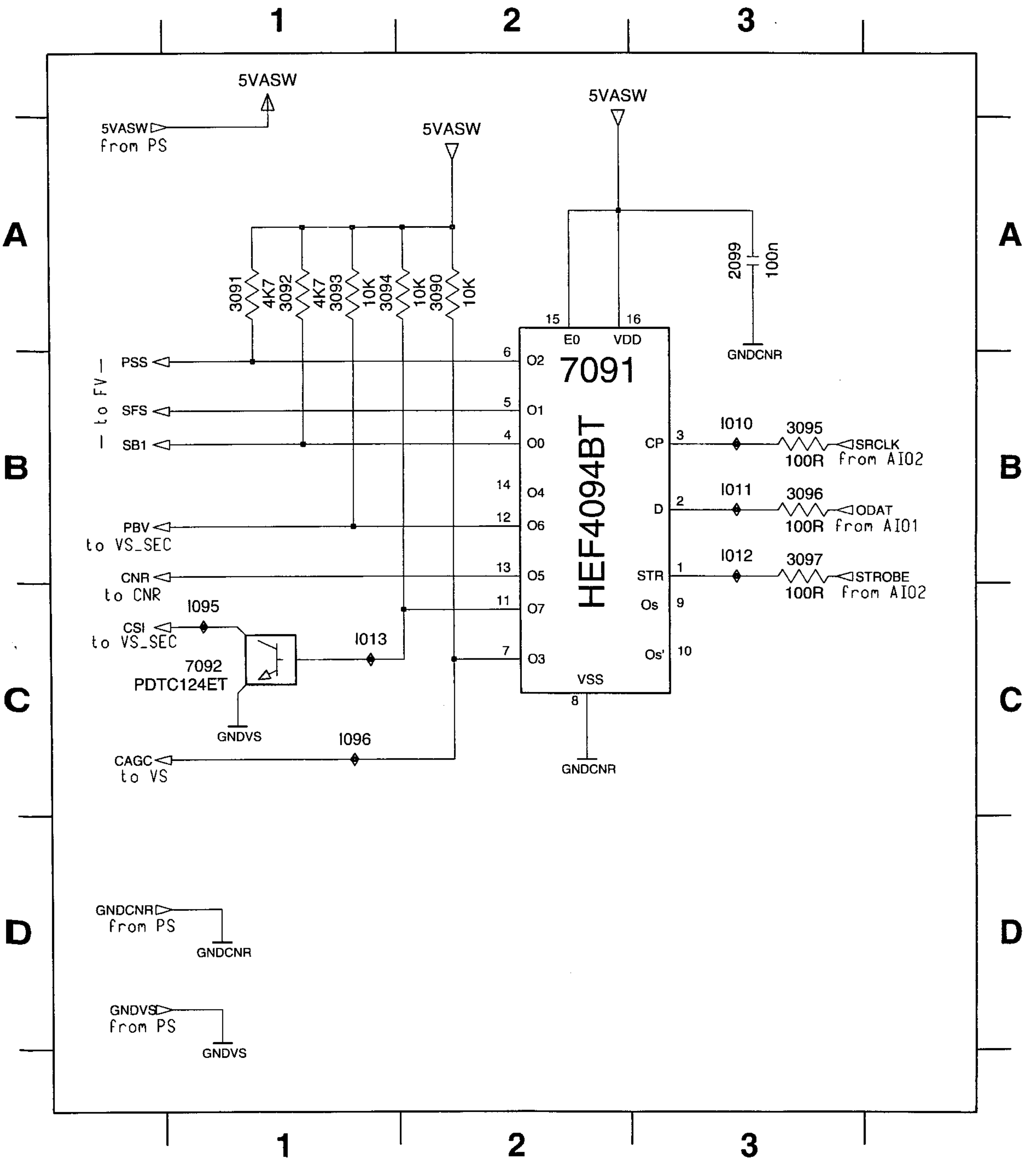


A: DC, 1 V/Div, 5ms/Div
SWIN

Standard Play

Port Expander (PE)

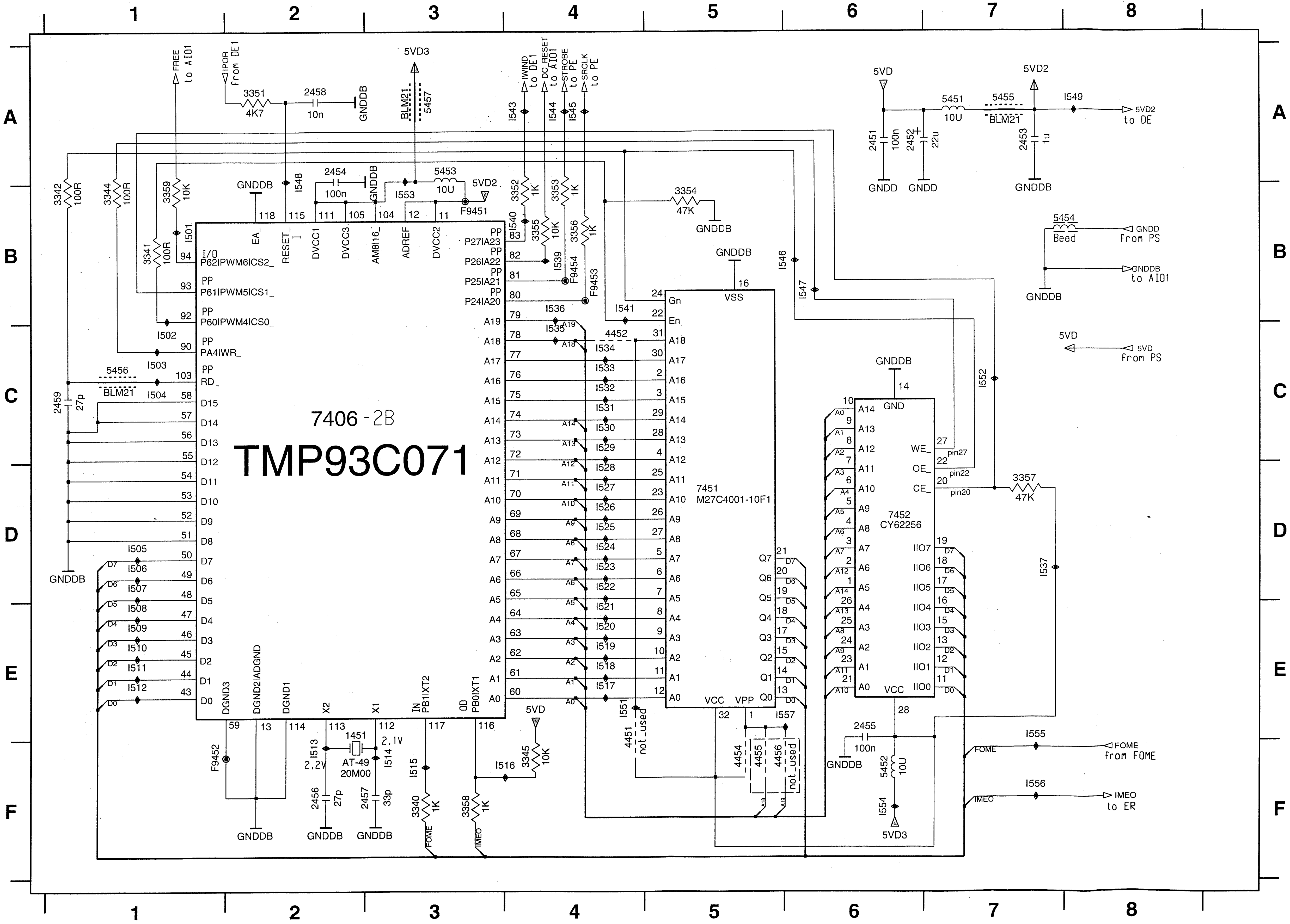
2099	A3
3090	A2
3091	A1
3092	A1
3093	A1
3094	A1
3095	B3
3096	B3
3097	B3
7091	B2
7092	C1
I010	B3
I011	B3
I012	B3
I013	C1
I095	C1
I096	C1


1
2
3
A
B
C
D
5VASW
5VASW
from PS
5VASW
5VASW
3091
4K7
3092
4K7
3093
10K
3094
10K
3090
10K
2099
100n
GNDCNR
15
16
E0
VDD
7091
HEF4094BT
PSS
SFS
SB1
— to FV —
6 O2
5 O1
4 O0
14 O4
12 O6
13 O5
11 O7
7 O3
CP 3
D 2
STR 1
Os 9
Os' 10
VSS
8
GNDCNR
I010
3095
100R
SRCLK
from AI02
I011
3096
100R
ODAT
from AI01
I012
3097
100R
STROBE
from AI02
PBV
to VS_SEC
CNR
to CNR
I095
CSI
to VS_SEC
7092
PDTC124ET
I013
GNDVS
I096
CAGC
to VS
GNDCNR
from PS
GNDCNR
GNDVS
from PS
GNDVS

Central / Deck Control 2 (AIO2)

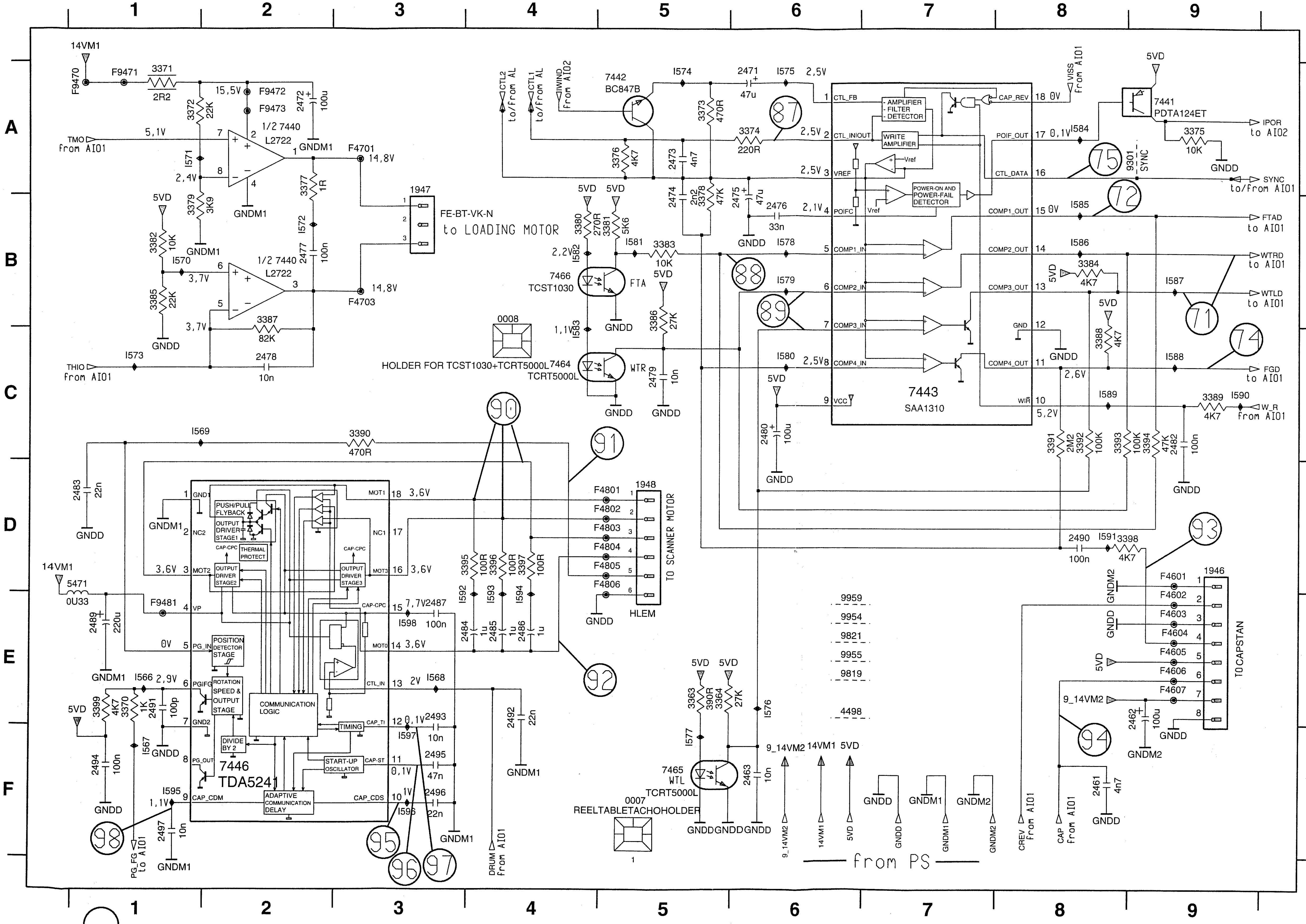
Interconnections Manual Page

AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31		
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35		


1
2
3
4
5
6
7
8
A
B
C
D
E
F
7406-2B
TMP93C071
7451
M27C4001-10F1
7452
CY62256
FREE to AIO1
IPOR from DE1
3351 4K7
2458 10n
GNDDB
5VD3
BLM21
5457
IWIND to DE1
DC_RESET to AIO1
STROBE to PE
SRCLK to PE
I543
I544
I545
3342 100R
3344 100R
3359 10K
3341 100R
I501
I548
2454 100n
5453 10U
5VD2
I553
F9451
3352 1K
3353 1K
3355 10K
3356 1K
I540
I539
F9454
F9453
3354 47K
I546
I547
I552
I541
I536
I535
4452
I534
I533
I532
I531
I530
I529
I528
I527
I526
I525
I524
I523
I522
I521
I520
I519
I518
I517
5456 BLM21
2459 27p
I502
I503
I504
I505
I506
I507
I508
I509
I510
I511
I512
EA_
RESET_
DVCC1
DVCC3
AM8I16_
ADREF
DVCC2
I/O P62IPWM6ICS2_
PP P61IPWM5ICS1_
PP P60IPWM4ICS0_
PP PA4IWR_
PP RD_
D15
D14
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
PP P27IA23
PP P26IA22
PP P25IA21
PP P24IA20
A19
A18
A17
A16
A15
A14
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
DGND3
DGND2IADGND
DGND1
X2
X1
IN PB1IXT2
OD PB0IXT1
F9452
1451 AT-49 20M00
I513
I514
2,2V
2,1V
2456 27p
2457 33p
I515
3340 1K
3358 1K
FOME
IMEO
5VD
3345 10K
I516
I551
4451 not_used
4454
4455
4456 not_used
I557
Gn
En
VSS
VCC
VPP
Q7
Q6
Q5
Q4
Q3
Q2
Q1
Q0
GND
WE_
OE_
CE_
pin27
pin22
pin20
IIO7
IIO6
IIO5
IIO4
IIO3
IIO2
IIO1
IIO0
3357 47K
I537
2455 100n
5452 10U
I554
5VD3
I555
FOME from FOME
I556
IMEO to ER
5VD
5451 10U
5455 BLM21
I549
5VD2 to DE
2451 100n
2452 22u
2453 1u
GNDD
5454 Bead
GNDD from PS
GNDDB to AIO1
5VD from PS

1451	E2
2451	A6
2452	A6
2453	A7
2454	A2
2455	E6
2456	F2
2457	F3
2458	A2
2459	C1
3340	F3
3341	B1
3342	B1
3344	B1
3345	F4
3351	A2
3352	B4
3353	B4
3354	B5
3355	B4
3356	B4
3357	D7
3358	F3
3359	B1
4451	E4
4452	C4
4454	F5
4455	F5
4456	F5
5451	A7
5452	F6
5453	A3
5454	B8
5455	A7
5456	C1
5457	A3
7406	C2
7451	D5
7452	D6
F9451	B3
F9452	F1
F9453	B4
F9454	B4
I501	B1
I502	C1
I503	C1
I504	C1
I505	D1
I506	D1
I507	D1
I508	E1
I509	E1
I510	E1
I511	E1
I512	E1
I513	F2
I514	F3
I515	F3
I516	F4
I517	E4
I518	E4
I519	E4
I520	E4
I521	E4
I522	D4
I523	D4
I524	D4
I525	D4
I526	D4
I527	D4
I528	D4
I529	C4
I530	C4
I531	C4
I532	C4
I533	C4
I534	C4
I535	C4
I536	B4
I537	D7
I539	B4
I540	B4
I541	B4
I543	A4
I544	A4
I545	A4
I546	B5
I547	B6
I548	A2
I549	A8
I551	E4
I552	C7
I553	B3
I554	F6
I555	E7
I556	F7
I557	E6

Deck Electronics (DE)


1 2 3 4 5 6 7 8 9
A B C D E F
14VM1
F9470
F9471
3371
2R2
15,5V
F9472
F9473
2472
100u
3372
22K
1/2 7440
L2722
TMO
from AIO1
5,1V
GNDM1
F4701
14,8V
1571
2,4V
3377
1R
5VD
3379
3K9
GNDM1
1947
FE-BT-VK-N
to LOADING MOTOR
1572
2477
100n
3382
10K
1570
3,7V
1/2 7440
L2722
3385
22K
3387
82K
F4703
14,8V
GNDD
1573
THIO
from AIO1
2478
10n
CTL2
to/from AL
CTL1
to/from AL
IWIND
from AIO2
7442
BC847B
1574
2471
47u
1575
2,5V
3373
470R
87
3374
220R
3376
4K7
2473
4n7
2474
2n2
3378
47K
2475
47u
2476
33n
GNDD
5VD
3380
270R
3381
5K6
1581
3383
10K
2,2V
1582
7466
TCST1030
FTA
0008
HOLDER FOR TCST1030+TCRT5000L
1,1V
1583
7464
TCRT5000L
WTR
3386
27K
2479
10n
GNDD
1578
88
1579
89
1580
2,5V
2480
100u
7443
SAA1310
CTL_FB
AMPLIFIER
FILTER
DETECTOR
CTL_IN/OUT
WRITE AMPLIFIER
VREF
POIFC
POWER-ON AND POWER-FAIL DETECTOR
COMP1_IN
COMP2_IN
COMP3_IN
COMP4_IN
VCC
CAP_REV
POIF_OUT
CTL_DATA
COMP1_OUT
COMP2_OUT
COMP3_OUT
GND
COMP4_OUT
WR
VISS
from AIO1
18 0V
17 0,1V
1584
75
9301
SYNC
72
1585
15 0V
1586
3384
4K7
1587
71
74
1588
2,6V
1589
5,2V
3389
4K7
1590
W_R
from AIO1
3391
2M2
3392
100K
3393
100K
3394
47K
2482
100n
5VD
7441
PDTA124ET
3375
10K
IPOR
to AIO2
SYNC
to/from AIO1
FTAD
to AIO1
WTRD
to AIO1
WTLD
to AIO1
FGD
to AIO1
3388
4K7
90
91
1569
3390
470R
2483
22n
7446
TDA5241
GND1
NC2
MOT2
VP
PG_IN
PGIFG
GND2
PG_OUT
CAP_CDM
PUSH/PULL FLYBACK
OUTPUT DRIVER STAGE1
THERMAL PROTECT
OUTPUT DRIVER STAGE2
OUTPUT DRIVER STAGE3
POSITION DETECTOR STAGE
ROTATION SPEED & OUTPUT STAGE
DIVIDE BY 2
COMMUNICATION LOGIC
TIMING
START-UP OSCILLATOR
ADAPTIVE COMMUNICATION DELAY
MOT1
NC1
MOT3
CAP-CPC
MOTO
CTL_IN
CAP_TI
CAP_ST
CAP_CDS
18 3,6V
17
16 3,6V
15 7,7V
14 3,6V
13 2V
12 0,1V
11 0,1V
10 1V
3,6V
0V
2,9V
1,1V
14VM1
5471
0U33
F9481
2489
220u
1566
3399
4K7
3370
1K
2491
100p
1567
2494
100n
1595
98
2497
10n
PG_FG
to AIO1
GNDM1
2487
100n
1598
1592
1593
1594
3395
100R
3396
100R
3397
100R
2484
1u
2485
1u
2486
1u
1568
2492
22n
2493
10n
1597
2495
47n
2496
22n
1596
95
96
97
92
DRUM
from AIO1
F4801
F4802
F4803
F4804
F4805
F4806
1948
HLEM
TO SCANNER MOTOR
9959
9954
9821
9955
9819
4498
5VD
3363
390R
3364
27K
1576
1577
7465
WTL
TCRT5000L
2463
10n
0007
REELTABLETACHOHOLDER
9_14VM2
14VM1
GNDD
GNDM1
GNDM2
from PS
2490
100n
1591
3398
4K7
93
1946
F4601
F4602
F4603
F4604
F4605
F4606
F4607
TOCAPSTAN
9_14VM2
2462
100u
94
2461
4n7
CREV
from AIO1
CAP
from AIO1

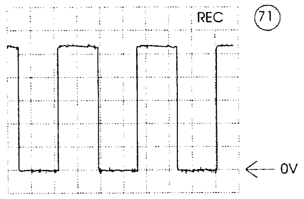
OSCILLOGRAMS

... V MEASURED IN PLAYBACK MODE

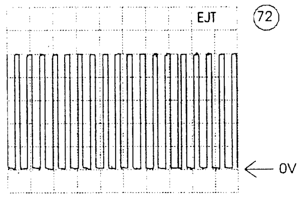
... V MEASURED IN RECORD MODE

0007	F5
0008	B4
1946	D9
1947	A3
1948	D5
2461	F8
2462	E9
2463	F6
2471	A6
2472	A2
2473	A5
2474	B5
2475	B6
2476	B6
2477	B2
2478	C2
2479	C5
2480	C6
2482	C9
2483	D1
2484	E4
2485	E4
2486	E4
2487	E3
2489	E1
2490	D8
2491	E1
2492	E4
2493	E3
2494	F1
2495	F3
2496	F3
2497	F1
3363	E5
3364	E5
3370	E1
3371	A1
3372	A1
3373	A5
3374	A6
3375	A9
3376	A5
3377	A2
3378	B5
3379	B1
3380	B4
3381	B5
3382	B1
3383	B5
3384	B8
3385	B1
3386	B5
3387	B2
3388	C8
3389	C9
3390	C3
3391	C8
3392	C8
3393	C8
3394	C9
3395	D4
3396	D4
3397	D4
3398	D8
3399	E1
4498	E6
5471	D1
7440	A2
7440	B2
7441	A9
7442	A5
7443	C7
7446	F2
7464	C4
7465	F5
7466	B4
9301	A8
9819	E6
9821	E6
9954	E6
9955	E6
9959	E6
F4601	D9
F4602	E9
F4603	E9
F4604	E9
F4605	E9
F4606	E9
F4607	E9
F4701	A3
F4703	B3
F4801	D5
F4802	D5
F4803	D5
F4804	D5
F4805	D5
F4806	D5
F9470	A1
F9471	A1
F9472	A2
F9473	A2
F9481	E1
I566	E1
I567	F1
I568	E3
I569	C1
I570	B1
I571	A1
I572	B2
I573	C1
I574	A5
I575	A6
I576	E6
I577	F5
I578	B6
I579	B6
I580	C6
I581	B5
I582	B4
I583	C4
I584	A8
I585	B8
I586	B8
I587	B9
I588	C9
I589	C8
I590	C9
I591	D8
I592	E3
I593	E4
I594	E4
I595	F1
I596	F3
I597	F3
I598	E3

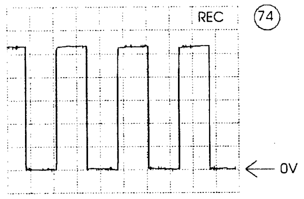
Oscillograms Deck Electronics



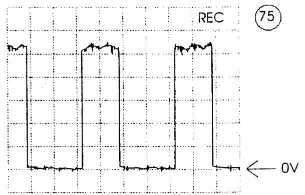
A: DC, 1 V/Div, 200ms/Div
IC 7406 Pin 6/7



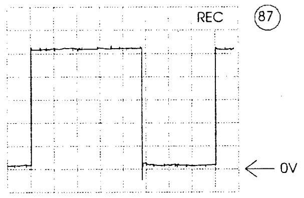
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



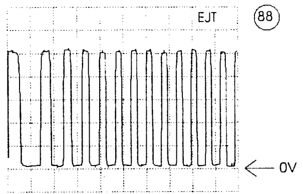
A: DC, 1 V/Div, 500us/Div
IC 7406 Pin 32



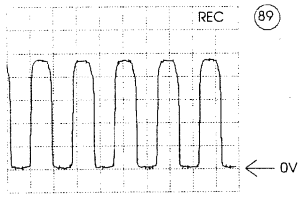
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 27/42



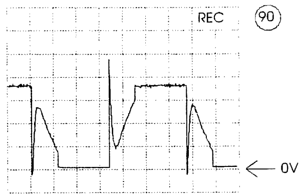
A: DC, 1 V/Div, 5ms/Div
IC 7443 Pin 2



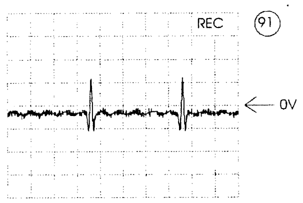
A: DC, 1 V/Div, 20ms/Div
IC 7443 Pin 5



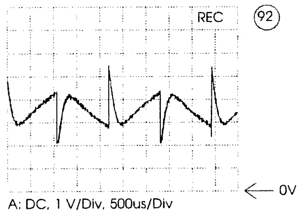
A: DC, 1 V/Div, 500ms/Div
IC 7443 Pin 6/7



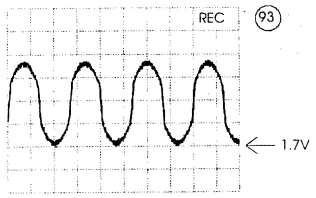
A: DC, 2 V/Div, 1ms/Div
Connector 1948 Pin 1/2/3



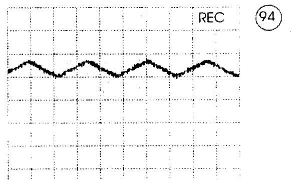
A: DC, 200mV/Div, 10ms/Div
Connector 1948 Pin 5



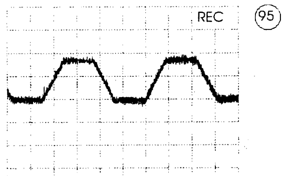
A: DC, 1 V/Div, 500us/Div
Connector 1948 Pin 4



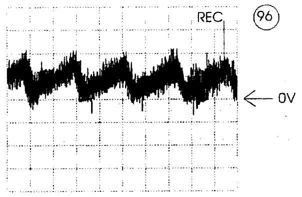
A: DC, 500mV/Div, 500us/Div
Connector 1946 Pin 4



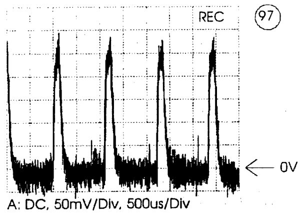
A: DC, 500mV/Div, 10us/Div
Connector 1946 Pin 6



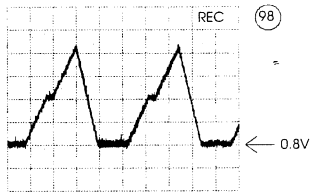
A: DC, 200mV/Div, 500us/Div
IC 7446 Pin 10



A: DC, 50mV/Div, 500us/Div
IC 7446 Pin 11



A: DC, 50mV/Div, 500us/Div
IC 7446 Pin 12



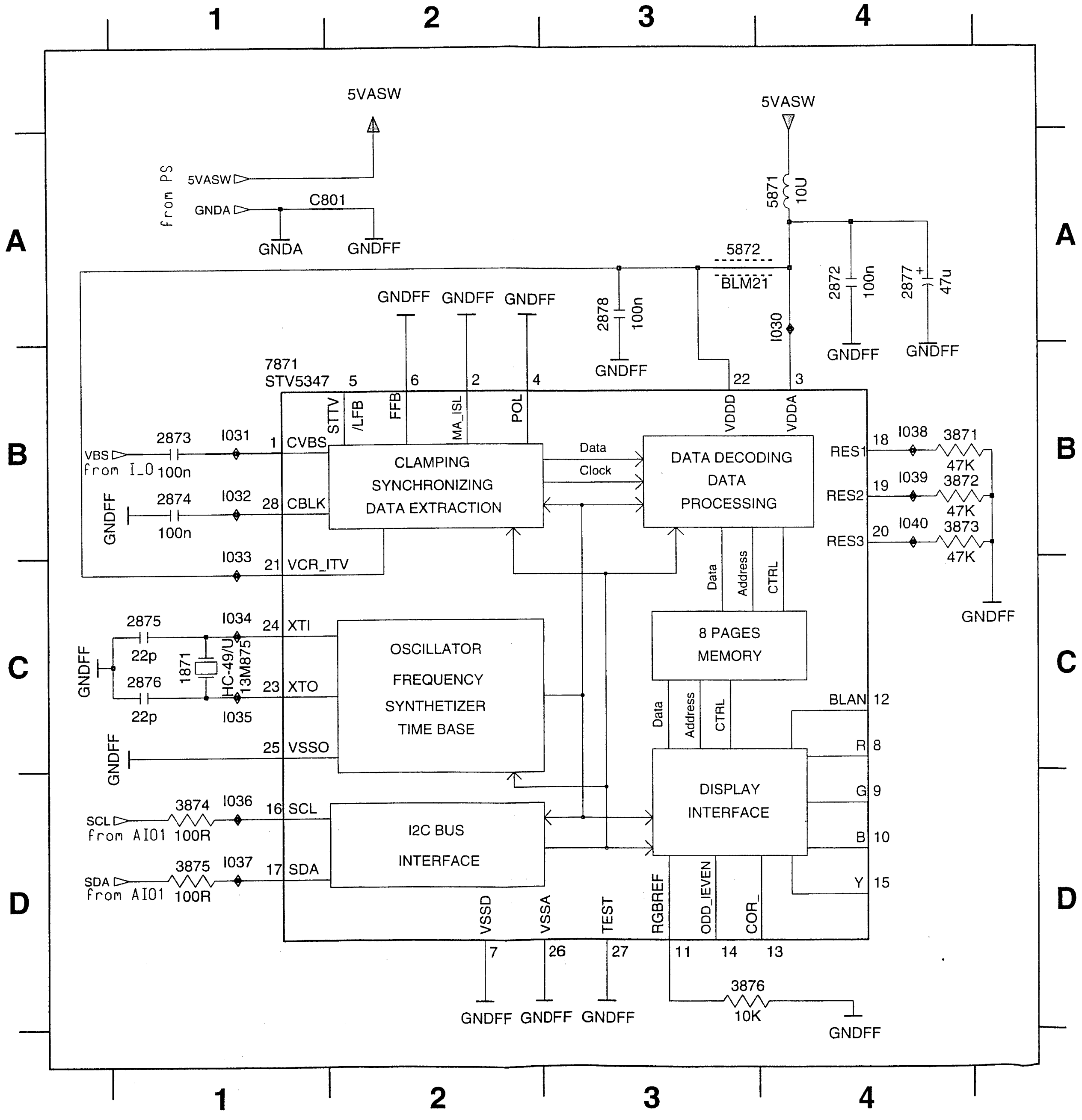
A: AC, 200mV/Div, 500us/Div
IC 7446 Pin 9

Interconnections Manual Page

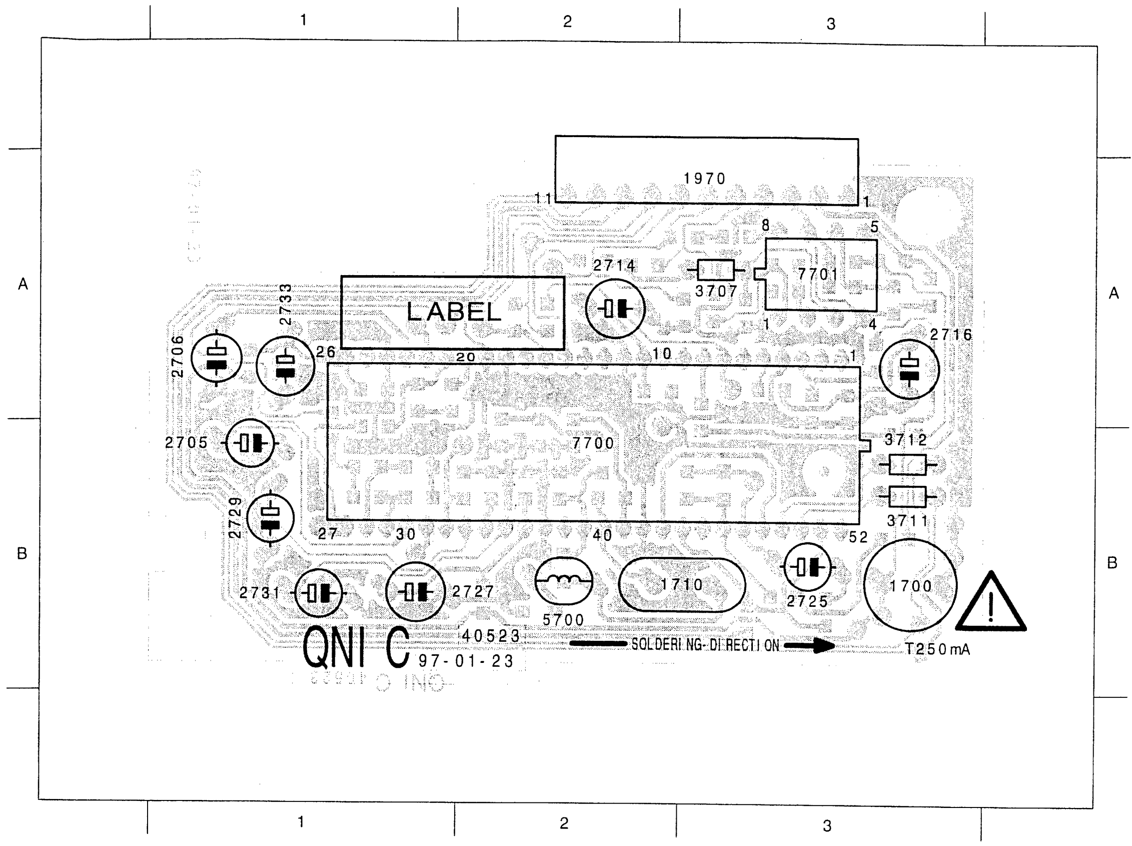
AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35

Text Data Slicer (FF)

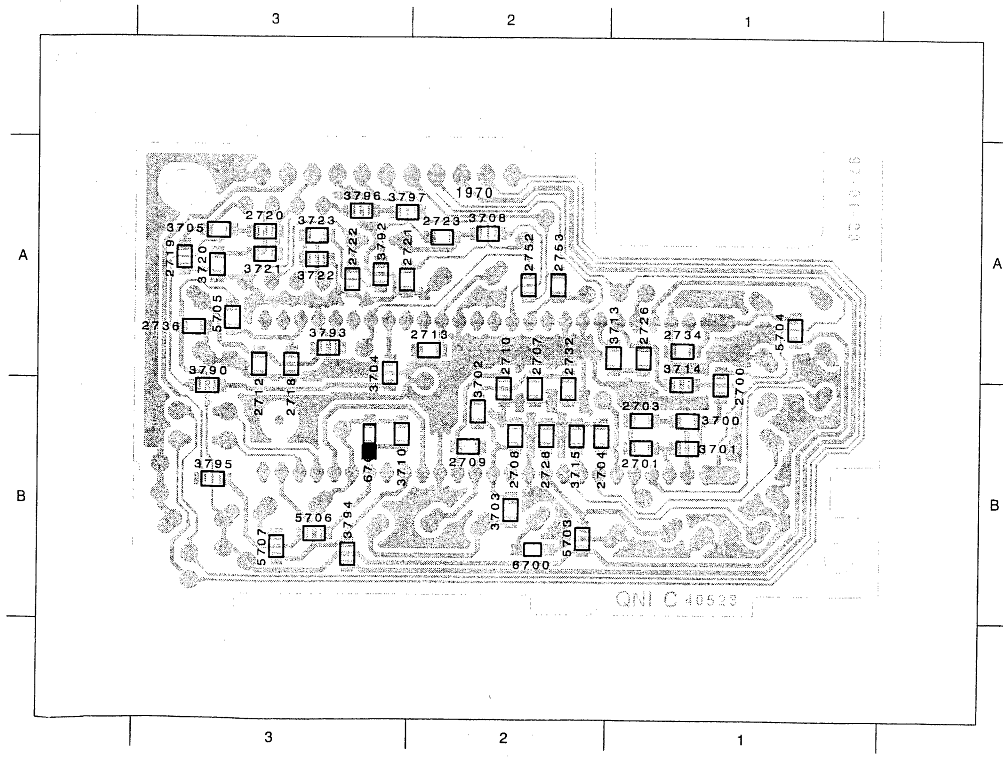
1871 C1	2874 B1	2877 A4	3872 B4	3875 D1	5872 A3	I030 A4	I033 B1	I036 D1	I039 B4
2872 A4	2875 C1	2878 A3	3873 B4	3876 D3	7871 B1	I031 B1	I034 C1	I037 D1	I040 B4
2873 B1	2876 C1	3871 B4	3874 D1	5871 A4	C801 A2	I032 B1	I035 C1	I038 B4	


1
2
3
4
A
B
C
D
5VASW
from PS
5VASW
GNDA
C801
GNDA
GNDFF
5VASW
5871
10U
5872
BLM21
2872
100n
2877
47u
GNDFF
GNDFF
2878
100n
GNDFF
GNDFF GNDFF GNDFF
I030
7871
STV5347
5
6
2
4
22
3
STTV
/LFB
FFB
MA_ISL
POL
VDDD
VDDA
VBS
from I_O
2873
100n
I031
1 CVBS
2874
100n
I032
28 CBLK
I033
21 VCR_ITV
CLAMPING
SYNCHRONIZING
DATA EXTRACTION
Data
Clock
DATA DECODING
DATA
PROCESSING
RES1 18
RES2 19
RES3 20
I038
3871
47K
I039
3872
47K
I040
3873
47K
GNDFF
Data
Address
CTRL
8 PAGES
MEMORY
2875
22p
2876
22p
1871
HC-49/U
13M875
I034
24 XTI
I035
23 XTO
25 VSSO
OSCILLATOR
FREQUENCY
SYNTHETIZER
TIME BASE
Data
Address
CTRL
DISPLAY
INTERFACE
BLAN 12
R 8
G 9
B 10
Y 15
SCL
from AI01
3874
100R
I036
16 SCL
SDA
from AI01
3875
100R
I037
17 SDA
I2C BUS
INTERFACE
VSSD
VSSA
TEST
RGBREF
ODD_IEVEN
COR_
7
26
27
11
14
13
GNDFF GNDFF GNDFF
3876
10K
GNDFF

Nicam Board (QNIC)

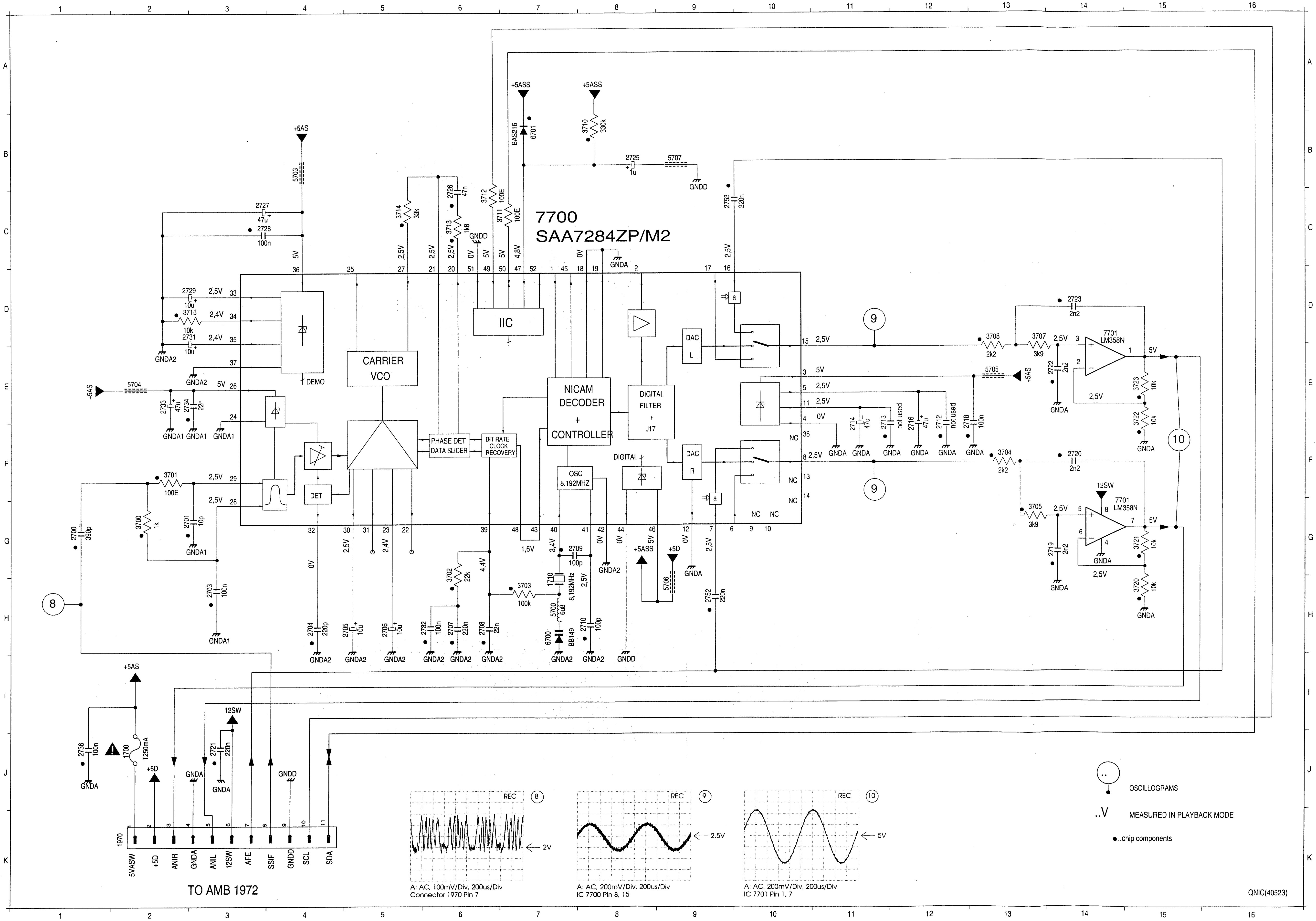

1
2
3
A
B
1970
11
1
8
5
2714
3707
7701
4
LABEL
2733
2706
26
20
10
2716
2705
7700
3712
2729
3711
27
30
40
52
2731
2727
5700
1710
2725
1700
QNI C
40523
97-01-23
SOLDERING-DIRECTION
T250mA

1700	B	3
1710	B	3
1970	A	3
2705	B	1
2706	A	1
2714	A	2
2716	A	3
2725	B	3
2727	B	1
2729	B	1
2731	B	1
2733	A	1
3707	A	3
3711	B	3
3712	B	3
5700	B	2
7700	B	2
7701	A	3


3
2
1
A
B
3796
3797
1970
3705
2720
3723
2722
3792
2721
2723
3708
2719
3720
3721
3722
2752
2753
2736
5705
3793
2713
2710
2707
2732
3713
2726
2734
5704
3790
2712
2718
3704
3702
3714
2700
2703
3700
3795
3710
2709
2708
2728
3715
2704
2701
3701
5706
3794
3703
5703
5707
6700
QNI C 40523

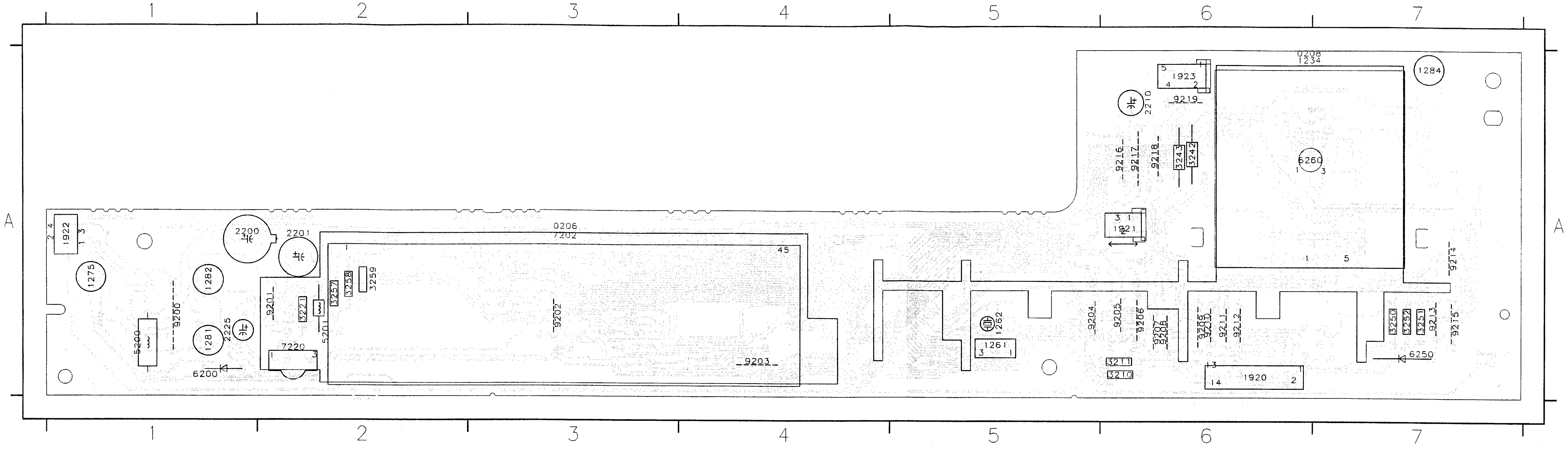
2700	B	1
2701	B	1
2703	B	1
2704	B	2
2707	B	2
2708	B	2
2709	B	2
2710	B	2
2712	A	3
2713	A	2
2718	A	3
2719	A	3
2720	A	3
2721	A	3
2722	A	3
2723	A	2
2726	A	1
2728	B	2
2732	B	2
2734	A	1
2736	A	3
2752	A	2
2753	A	2
3700	B	1
3701	B	1
3702	B	2
3703	B	2
3704	A	3
3705	A	3
3708	A	2
3710	B	3
3713	A	1
3714	B	1
3715	B	2
3720	A	3
3721	A	3
3722	A	3
3723	A	3
3790	B	3
3792	A	3
3793	A	3
3794	B	3
3795	B	3
3796	A	3
3797	A	3
5703	B	2
5704	A	1
5705	A	3
5706	B	3
5707	B	3
6700	B	2
6701	B	3

Nicam Board (QNIC)

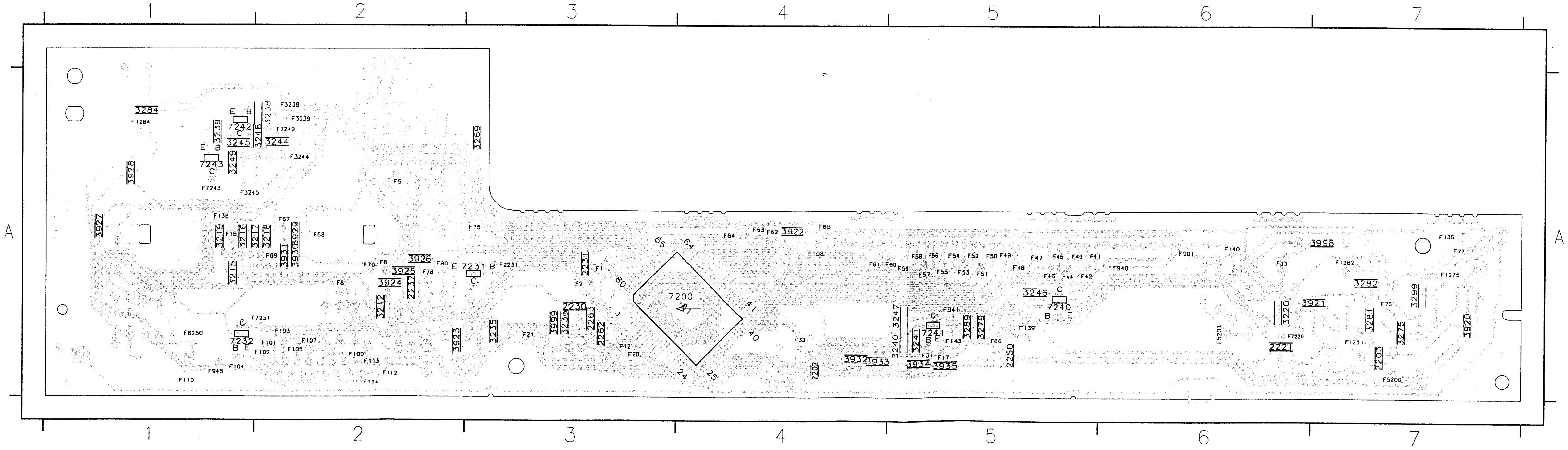

7700
SAA7284ZP/M2
IIC
CARRIER
VCO
DEMO
PHASE DET
DATA SLICER
BIT RATE
CLOCK
RECOVERY
DET
NICAM
DECODER
+
CONTROLLER
DIGITAL
FILTER
+
J17
DAC
L
DAC
R
DIGITAL
OSC
8.192MHZ
7701
LM358N
+5AS
+5ASS
+5D
12SW
GNDA
GNDA1
GNDA2
GNDD
BAS216
BB149
T250mA
1970
5VASW
+5D
ANIR
GNDA
ANIL
12SW
AFE
SSIF
GNDD
SCL
SDA
TO AMB 1972
REC
2V
2.5V
5V
A: AC, 100mV/Div, 200us/Div
Connector 1970 Pin 7
A: AC, 200mV/Div, 200us/Div
IC 7700 Pin 8, 15
A: AC, 200mV/Div, 200us/Div
IC 7701 Pin 1, 7
OSCILLOGRAMS
..V MEASURED IN PLAYBACK MODE
●..chip components
QNIC(40523)

1700	J 2
1710	H 7
1970	K 2
2700	G 1
2701	G 2
2703	H 3
2704	H 4
2705	H 5
2706	H 5
2707	H 6
2708	H 6
2709	G 7
2710	H 8
2712	F12
2713	F11
2714	F11
2716	F12
2718	F12
2719	G14
2720	F14
2721	J 3
2722	E14
2723	D14
2725	B 8
2726	C 6
2727	C 3
2728	C 3
2729	D 2
2731	D 2
2732	H 6
2733	E 2
2734	E 2
2736	J 1
2752	H 9
2753	C 9
3700	G 2
3701	F 2
3702	G 6
3703	H 7
3704	F13
3705	G13
3707	D13
3708	D13
3710	B 8
3711	C 7
3712	C 6
3713	C 6
3714	C 5
3715	D 3
3720	H15
3721	G15
3722	E15
3723	E15
5700	H 7
5703	B 4
5704	E 2
5705	E13
5706	H 9
5707	B 9
6700	H 7
6701	B 7
7700	C 7
7701	D14
7701	G14

Display Control ADCP3 (DC)

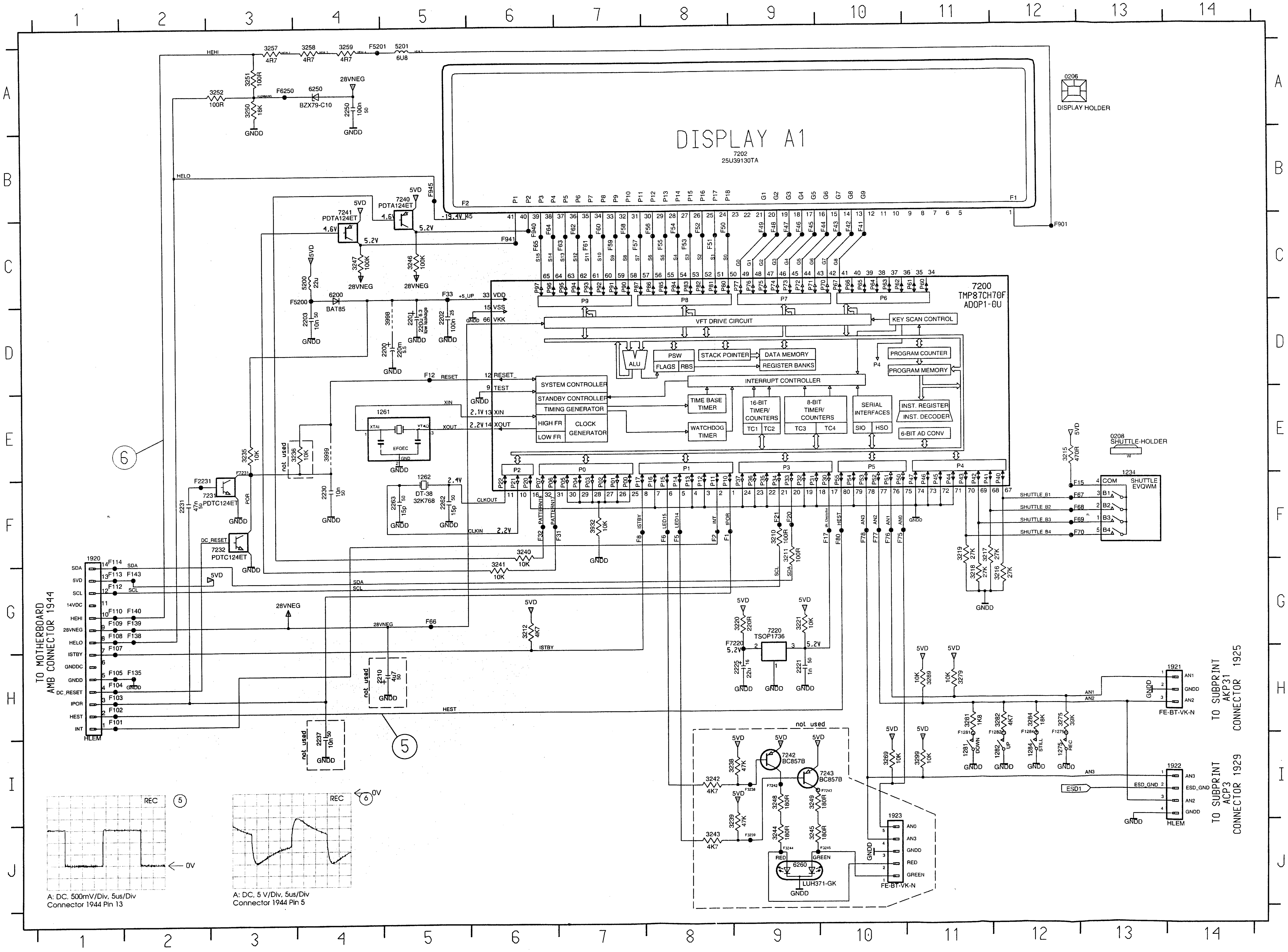

1
2
3
4
5
6
7
A
1922
1275
2200
2201
1282
1281
2225
5200
9200
9201
3221
3257
3258
3259
5201
7220
6200
0206
7202
45
9202
9203
1262
1261
9204
9205
9206
9207
9208
9209
9210
9211
9212
9213
9214
9215
3211
3210
1920
14
3250
3252
3251
6250
1923
2210
9219
9216
9217
9218
3243
3242
1921
0208
1234
1284
6260

0206	A3
0208	A6
1234	A6
1261	A5
1262	A5
1275	A1
1281	A1
1282	A1
1284	A7
1920	A6
1921	A6
1922	A1
1923	A6
2200	A1
2201	A2
2210	A6
2225	A1
3210	A6
3211	A6
3221	A2
3242	A6
3243	A6
3250	A7
3251	A7
3252	A7
3257	A2
3258	A2
3259	A2
5200	A1
5201	A2
6200	A1
6250	A7
6260	A6
7202	A3
7220	A2
9200	A1
9201	A2
9202	A3
9203	A4
9204	A5
9205	A6
9206	A6
9207	A6
9208	A6
9209	A6
9210	A6
9211	A6
9212	A6
9213	A7
9214	A7
9215	A7
9216	A6
9217	A6
9218	A6
9219	A6


1
2
3
4
5
6
7
A
3284
3928
3927
7242
7243
3239
3245
3249
3248
3238
3244
3269
3219
3216
3217
3218
3215
3931
3930
3929
7232
3926
3925
3924
3212
2237
7231
3923
3235
2231
3999
3236
2230
2263
2262
7200
80
65
64
41
40
24
25
3922
2202
3932
3933
3240
3247
3241
7241
3934
3935
3289
3279
2250
3246
7240
3998
3220
3921
2221
3282
3281
2203
3275
3299
3920

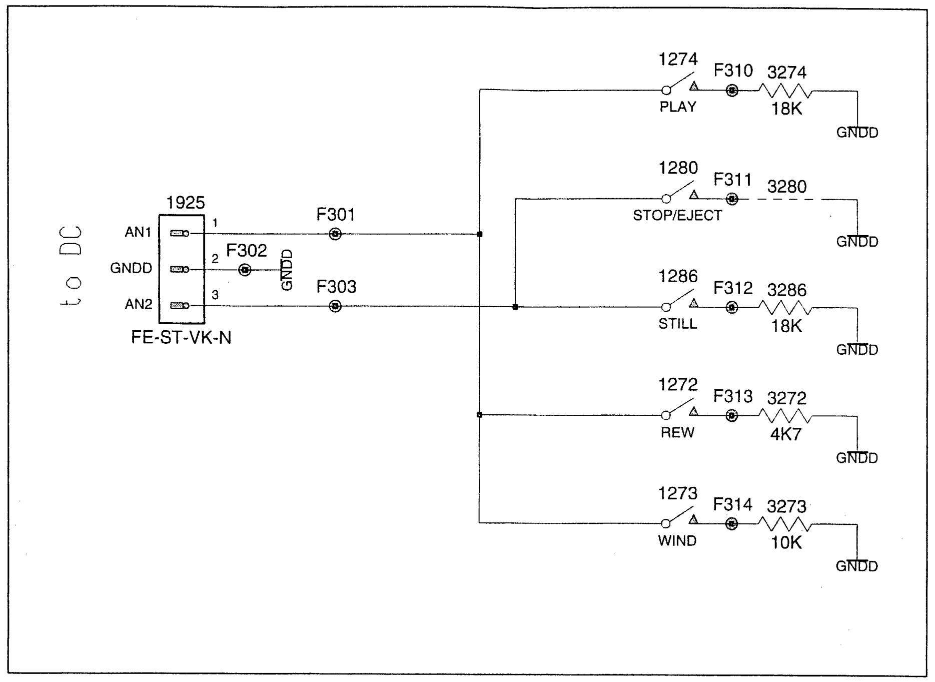
2202	A4
2203	A7
2221	A6
2230	A3
2231	A3
2237	A2
2250	A5
2262	A3
2263	A3
3212	A2
3215	A1
3216	A1
3217	A1
3218	A2
3219	A1
3220	A6
3235	A3
3236	A3
3238	A2
3239	A1
3240	A5
3241	A5
3244	A2
3245	A1
3246	A5
3247	A5
3248	A2
3249	A1
3269	A3
3275	A7
3279	A5
3281	A7
3282	A7
3284	A1
3289	A5
3299	A7
3920	A7
3921	A7
3922	A4
3923	A2
3924	A2
3925	A2
3926	A2
3927	A1
3928	A1
3929	A2
3930	A2
3931	A2
3999	A3
7200	A4
7231	A3
7232	A1
7240	A5
7241	A5
7242	A1
7243	A1

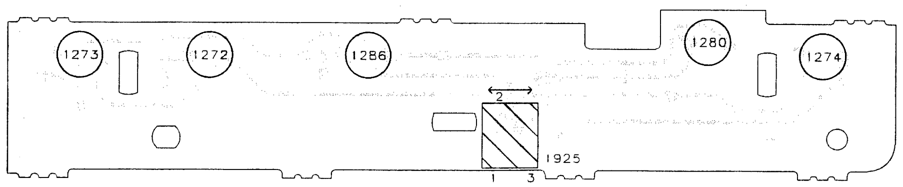
Display Control ADCP3 (DC)

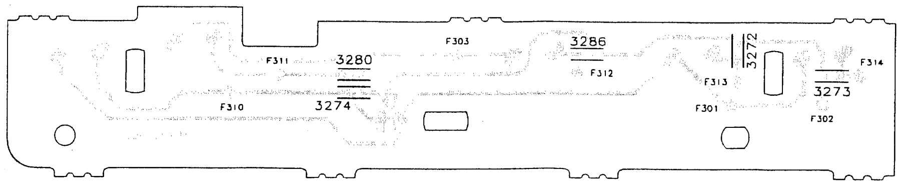

DISPLAY A1
7202
25U39130TA
0206
DISPLAY HOLDER
7200
TMP87CH70F
ADOP1-0U
VFT DRIVE CIRCUIT
KEY SCAN CONTROL
ALU
PSW
FLAGS
RBS
STACK POINTER
DATA MEMORY
REGISTER BANKS
PROGRAM COUNTER
PROGRAM MEMORY
INTERRUPT CONTROLLER
SYSTEM CONTROLLER
STANDBY CONTROLLER
TIMING GENERATOR
HIGH FR
LOW FR
CLOCK GENERATOR
TIME BASE TIMER
WATCHDOG TIMER
16-BIT TIMER/ COUNTERS
TC1
TC2
8-BIT TIMER/ COUNTERS
TC3
TC4
SERIAL INTERFACES
SIO
HSO
INST. REGISTER
INST. DECODER
6-BIT AD CONV
P0
P1
P2
P3
P4
P5
P6
P7
P8
P9
VDD
VSS
VKK
RESET
TEST
XIN
XOUT
1261
EFOEC
1262
DT-38
32K768
7240
PDTA124ET
7241
PDTA124ET
7231
PDTC124ET
7232
PDTC124ET
DC_RESET
F2231
6200
BAT85
6250
BZX79-C10
5201
6U8
28VNEG
5VD
GNDD
HEHI
HELO
SDA
SCL
ISTBY
HEST
IPOR
INT
1920
TO MOTHERBOARD AMB CONNECTOR 1944
HLEM
1234
SHUTTLE EVQWM
0208
SHUTTLE-HOLDER
SHUTTLE_B1
SHUTTLE_B2
SHUTTLE_B3
SHUTTLE_B4
7220
TSOP1736
not used
7242
BC857B
7243
BC857B
6260
LUH371-GK
RED
GREEN
1923
FE-BT-VK-N
1921
AN1
AN2
TO SUBPRINT AKP31 CONNECTOR 1925
1922
AN3
ESD_GND
ESD1
TO SUBPRINT ACP3 CONNECTOR 1929
1281 DOWN
1282 UP
1284 STILL
1275 REC
5
6
REC
0V
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13
A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5

F1	F8
F2	F8
F5	F8
F6	F8
F8	F7
F12	D5
F15	F12
F17	F10
F20	F9
F21	F9
F31	F7
F32	F6
F33	C5
F41	C10
F42	C10
F43	C10
F44	C10
F45	C9
F46	C9
F47	C9
F48	C9
F49	C9
F50	C8
F51	C8
F52	C8
F53	C8
F54	C8
F55	C8
F56	C8
F57	C7
F58	C7
F59	C7
F60	C7
F61	C7
F62	C7
F63	C7
F64	C6
F65	C6
F66	G5
F67	F12
F68	F12
F69	F12
F70	F12
F75	F10
F76	F10
F77	F10
F78	F10
F80	F10
0206	A12
0208	E13
1234	F13
1261	E4
1262	F5
1275	I12
1281	I11
1282	I12
1284	I12
1920	F1
1921	H13
1922	I13
1923	I10
2200	D5
2201	D5
2202	D5
2203	D4
2210	H4
2221	H9
2225	H9
2230	F4
2231	F2
2237	I4
2250	A4
2262	F5
2263	F5
3210	F9
3211	F9
3212	G6
3215	E12
3216	G12
3217	F11
3218	G11
3219	F11
3220	G9
3221	G9
3235	E3
3236	E3
3238	I8
3239	J8
3240	F6
3241	G6
3242	I8
3243	J8
3244	J9
3245	J9
3246	C5
3247	C4
3248	I9
3249	I9
3250	A3
3251	A3
3252	A3
3257	A3
3258	A4
3259	A4
3269	I10
3275	H12
3279	H11
3281	H11
3282	H12
3284	H12
3289	H11
3299	I11
3932	F7
3998	D5
3999	E4
5200	C4
5201	A5
6200	C4
6250	A4
6260	J9
7200	C11
7202	B9
7220	G9
7231	F2
7232	F3
7240	B5
7241	B4
7242	I9
7243	I9
ESD1	I12
F101	H1
F102	H1
F103	H1
F104	H1
F105	H1
F107	G1
F108	G1
F109	G1
F110	G1
F112	G1
F113	G1
F114	F1
F1275	I12
F1281	I11
F1282	I12
F1284	I12
F135	H2
F138	G2
F139	G2
F140	G2
F143	G2
F2231	F2
F3238	I9
F3239	J9
F3244	J9
F3245	J10
F5200	C4
F5201	A4
F6250	A3
F7220	G9
F7231	E3
F7242	I9
F7243	I10
F901	C12
F940	C6
F941	C6
F945	B5

Keyboard PCB AKP31

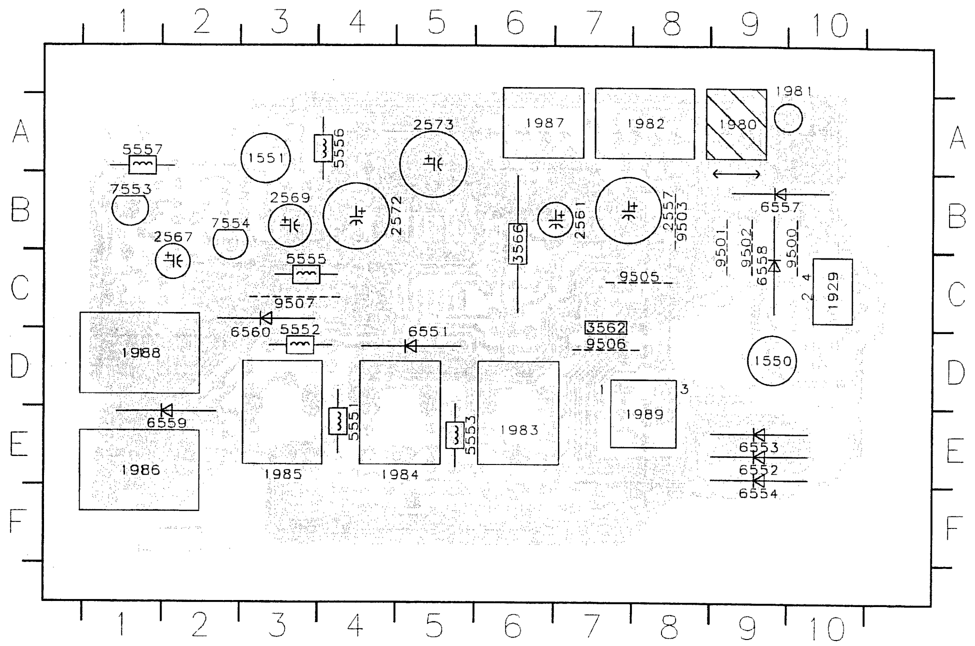

to DC
1925
AN1
GNDD
AN2
1
2
3
FE-ST-VK-N
F301
F302
GNDD
F303
1274
F310
3274
PLAY
18K
GNDD
1280
F311
3280
STOP/EJECT
GNDD
1286
F312
3286
STILL
18K
GNDD
1272
F313
3272
REW
4K7
GNDD
1273
F314
3273
WIND
10K
GNDD


1273
1272
1286
1280
1274
2
1925
1
3

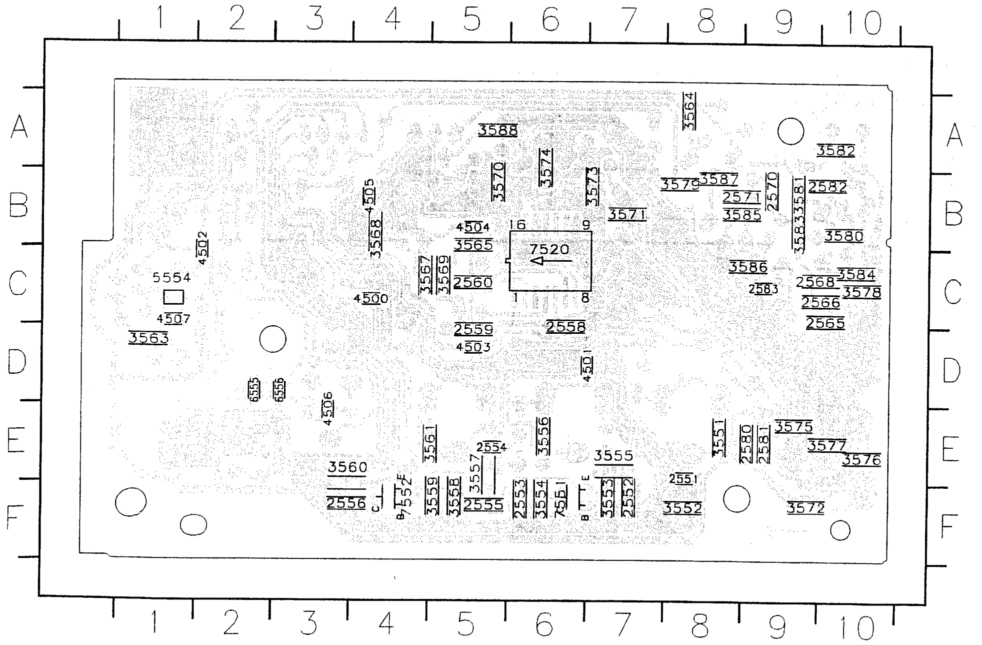

F311
3280
F303
3286
F312
3272
F313
F314
F310
3274
F301
3273
F302

Connector PCB ACP3

2551	E3	2559	D6	2580	E2	3554	F5	3561	E6	3570	B6	3577	E1	3584	C1	4502	C9	6555	D9
2552	F4	2560	C6	2581	E2	3555	E4	3563	D10	3571	B4	3578	C1	3585	B2	4503	D6	6556	D8
2553	F5	2565	C1	2582	B1	3556	E5	3564	A3	3572	F2	3579	B3	3586	C2	4504	B6	7520	C5
2554	E6	2566	C1	2583	C2	3557	E6	3565	B6	3573	B4	3580	B1	3587	B3	4505	B7	7551	F5
2555	F6	2568	C1	3551	E3	3558	F6	3567	C6	3574	A5	3581	B2	3588	A6	4506	E8	7552	F7
2556	F7	2570	B2	3552	F3	3559	F6	3568	B7	3575	E2	3582	A1	4500	C7	4507	C10		
2558	D5	2571	B2	3553	F4	3560	E7	3569	C6	3576	E1	3583	B2	4501	D4	5554	C10		

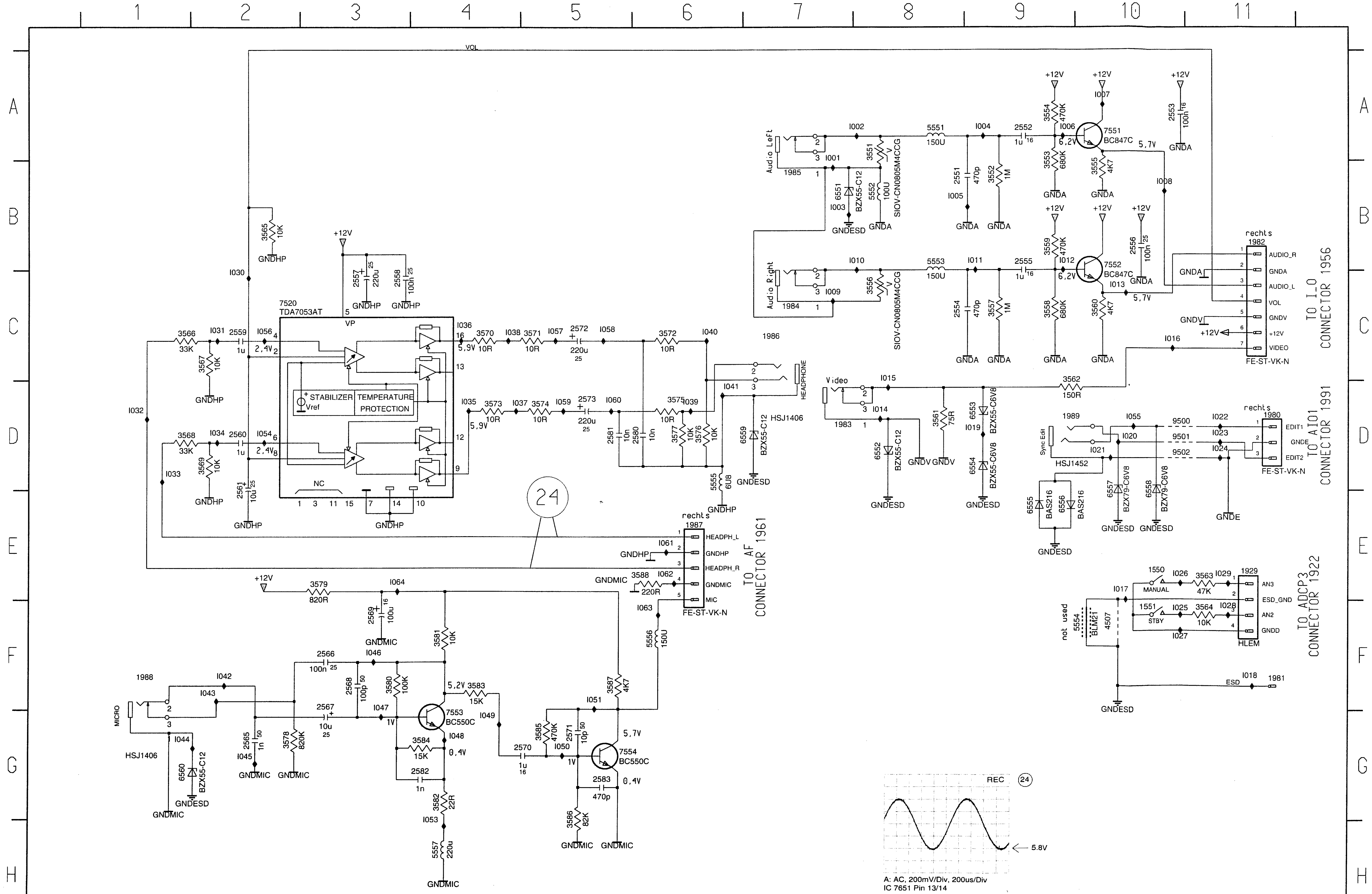

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
5557
7553
1551
5556
2573
1987
1982
1980
1981
2569
2572
7554
2567
5555
3566
2561
2557
9503
6557
9501
9502
6558
9500
9505
1929
9507
6560
5552
6551
3562
9506
1988
1550
1989
6559
5551
5553
1983
1985
1984
1986
6553
6552
6554

2551	E8	2559	D5	2580	E9	3554	F6	3561	E5	3570	B5	3577	E10	3584	C10	4502	C2	6555	D2
2552	F7	2560	C5	2581	E9	3555	E7	3563	D1	3571	B7	3578	C10	3585	B8	4503	D5	6556	D3
2553	F6	2565	C10	2582	B10	3556	E6	3564	A8	3572	F9	3579	B8	3586	C9	4504	B5	7520	C6
2554	E5	2566	C10	2583	C9	3557	E5	3565	B5	3573	B7	3580	B10	3587	B8	4505	B4	7551	F6
2555	F5	2568	C9	3551	E8	3558	F5	3567	C4	3574	A6	3581	B9	3588	A5	4506	E3	7552	F4
2556	F3	2570	B9	3552	F8	3559	F5	3568	B4	3575	E9	3582	A10	4500	C4	4507	C1		
2558	D6	2571	B8	3553	F7	3560	E3	3569	C5	3576	E10	3583	B9	4501	D7	5554	C1		


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
3588
3564
3582
3574
3570
3573
3587
3576
2571
2570
2582
3585
3583
3581
3571
4505
4504
3565
3568
7520
3580
4502
5554
3567
3569
2560
3586
2568
3584
3578
2566
2565
2583
4507
4500
3563
2559
2558
4503
4501
4506
3561
2554
3556
3575
3577
3576
3551
2580
2581
3560
3555
2556
2552
3559
3558
3557
2555
2553
3554
2551
3552
3572

Connector PCB ACP3

1550	E10
1551	F10
1929	E11
1980	D11
1981	F11
1982	B11
1983	D7
1984	C7
1985	B7
1986	C7
1987	E6
1988	F1
1989	D9
2551	B8
2552	A9
2553	A10
2554	C8
2555	B9
2556	B10
2557	C3
2558	C3
2559	C2
2560	D2
2561	D2
2565	G2
2566	F3
2567	F3
2568	F3
2569	F3
2570	G5
2571	G5
2572	C5
2573	D5
2580	D6
2581	D5
2582	G4
2583	G5
3551	A8
3552	B9
3553	B9
3554	A9
3555	B10
3556	C8
3557	C9
3558	C9
3559	B9
3560	C10
3561	D8
3562	D9
3563	E11
3564	F11
3565	B2
3566	C1
3567	C2
3568	D1
3569	D2
3570	C4
3571	C5
3572	C6
3573	D4
3574	D5
3575	D6
3576	D6
3577	D6
3578	G2
3579	E3
3580	F3
3581	F4
3582	G4
3583	F4
3584	G4
3585	G5
3586	H5
3587	F5
3588	E6
4507	F10
5551	A8
5552	B8
5553	B8
5554	F10
5555	D6
5556	F6
5557	H4
6551	B7
6552	D8
6553	D9
6554	D9
6555	E9
6556	E9
6557	D10
6558	D10
6559	D7
6560	G1
7520	C2
7551	A10
7552	B10
7553	G4
7554	G5
9500	D10
9501	D10
9502	D10
I001	A7
I002	A8
I003	B7
I004	A9
I005	B8
I006	A9
I007	A10
I008	B10
I009	C7
I010	B8
I011	B9
I012	B9
I013	C10
I014	D8
I015	C8
I016	C10
I017	E10
I018	F11
I019	D9
I020	D10
I021	D10
I022	D11
I023	D11
I024	D11
I025	F10
I026	E10
I027	F10
I028	F11
I029	E11
I030	C2
I031	C2
I032	D1
I033	D1
I034	D2
I035	D4
I036	C4
I037	D4
I038	C4
I039	D6
I040	C6
I041	D6
I042	F2
I043	F2
I044	G1
I045	G2
I046	F3
I047	F3
I048	G4
I049	G4
I050	G5
I051	F5
I053	H4
I054	D2
I055	D10
I056	C2
I057	C5
I058	C5
I059	D5
I060	D5
I061	E6
I062	E6
I063	F6
I064	E3



1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H
VOL
+12V
3565 10K
GNDHP
I030
7520
TDA7053AT
VP
5
2557 220u 25
2558 100n 25
3566 33K
I031
2559 1u
I056
2,4V
3567 10K
STABILIZER
Vref
TEMPERATURE PROTECTION
I032
3568 33K
I034
2560 1u
I054
3569 10K
I033
2561 10u 25
NC
1 3 11 15 7 14 10
16 13 12 9
I036
5,9V
3570 10R
I038
3571 10R
I057
2572 220u 25
I058
3572 10R
I040
I035
3573 10R
I037
3574 10R
I059
2573 220u 25
I060
3575 10R
I039
2581 10n
2580 10n
3577 10K
3576 10K
I041
5555 6U8
1986
HEADPHONE
6559 BZX55-C12
HSJ1406
GNDESD
24
rechts
1987
HEADPH_L
GNDHP
HEADPH_R
GNDMIC
MIC
I061
3588 220R
I062
I063
FE-ST-VK-N
TO AF CONNECTOR 1961
+12V
3579 820R
I064
2569 100u 16
GNDMIC
3581 10K
2566 100n 25
I046
2568 100p 50
3580 100K
5,2V
3583 15K
1988
I042
I043
MICRO
2567 10u 25
I047
1V
7553 BC550C
I049
I048
3584 15K
0,4V
2582 1n
3582 22R
I053
5557 220u
2565 1n 50
I045
3578 820K
HSJ1406
I044
6560 BZX55-C12
5556 150U
3587 4K7
I051
3585 470K
2571 10p 50
2570 1u 16
I050
7554 BC550C
5,7V
2583 470p
3586 82K
Audio Left
1985
I001
I002
3551
SIOV-CN0805M4CCG
6551 BZX55-C12
I003
5552 100U
GNDESD
GNDA
5551 150U
I004
2551 470p
I005
3552 1M
2552 1u 16
3554 470K
I006
6,2V
3553 680K
7551 BC847C
I007
3555 4K7
5,7V
I008
2553 100n 16
Audio Right
1984
I009
I010
3556
5553 150U
I011
2554 470p
3557 1M
2555 1u 16
3559 470K
I012
3558 680K
7552 BC847C
I013
3560 4K7
2556 100n 25
rechts
1982
AUDIO_R
GNDA
AUDIO_L
VOL
GNDV
+12V
VIDEO
I016
TO I_O CONNECTOR 1956
Video
1983
I015
I014
6552 BZX55-C12
3561 75R
6553 BZX55-C6V8
I019
6554 BZX55-C6V8
3562 150R
Sync Edit
1989
HSJ1452
I055
I020
I021
9500
9501
9502
I022
I023
I024
rechts
1980
EDIT1
GNDE
EDIT2
TO AIO1 CONNECTOR 1991
6555 BAS216
6556 BAS216
6557 BZX79-C6V8
6558 BZX79-C6V8
1550
MANUAL
I026
3563 47K
I029
1929
AN3
ESD_GND
AN2
GNDD
HLEM
I017
1551
STBY
I025
3564 10K
I028
I027
not used
5554
BLM21
4507
TO ADCP3 CONNECTOR 1922
ESD
I018
1981
REC
24
5.8V
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 13/14

Interconnections Manual Page

AF 3-26	AIO2 3-41	CNR 3-36	DE 3-42	FF 3-43	FOME 3-44	HA 3-32	PE 3-40	QNIC 3-46	VS 3-31
AIO1 3-38	AL 3-28	DC 3-48	ER 3-27	FM_STEREO 3-25	FV 3-24	I_O 3-37	PS 3-22	VPO 3-45	VS_SEC 3-35

4. DRIVE ASSEMBLY

This tape deck has three motors; one providing precision drive for the scanner unit; the second providing direct drive for the capstan and belt drive for the reel tables; the third motor drives the lift and tape threading/dethreading operations.

Special features are:

Quick start
Short winding time
Automatic cleaning of video heads by cleaning roller

To obtain a high repair standard we have developped a range of service kit's. These kit's covers the spare parts which are engaged together.
The tape deck's sensors are located on the motherboard underneath the tape deck, and included in its circuitry, lay out and parts list.

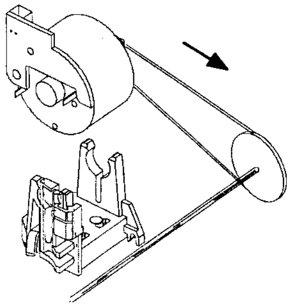
4.1 Deck parts replacement

The procedure for the removal and refitting of the following parts is described; only the lift, the scanner, the capstan motor and the A/C head are fixed by screws.
All the other deck assembly parts are held only by snap hooks.

For the replacement of parts on the underside of the tape deck, remove the tape deck from the motherboard.

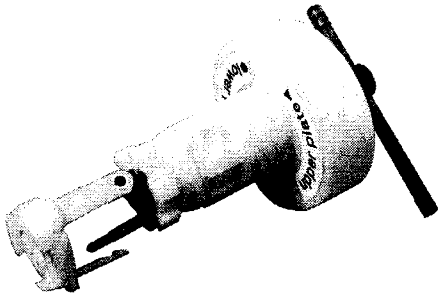
Manual extraction of cassette:
If, after the Eject button has been pressed, the drive does not unthread and eject the cassette, the dethreading/eject operation can also be carried out manually by turning the wheel at the rear of the threading motor.

fig. 1

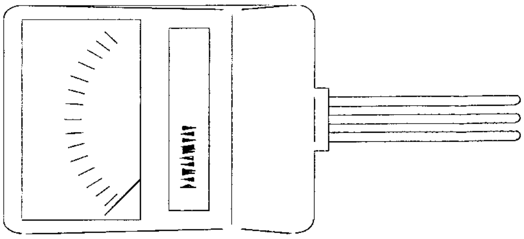


IMPORTANT:
After each repair has been carried out in the drive assembly, the first operation after repairing must be to bring the cassette compartment into „eject“ position by hand.

Auxiliary tools for deck adjustment:

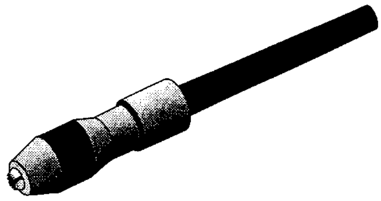


Tool for removing the head disc 4822 395 90977

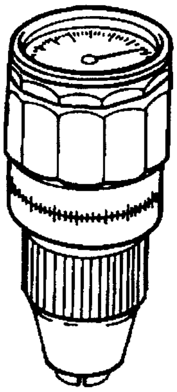


Tentelometer 4822 395 90584

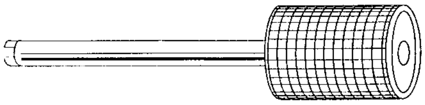
Tool for tapetension adjustment 4822 395 50188



Handle 4822 256 90493



Torquemeter:
600 gf-cm 4822 395 90232
90 gf-cm 4822395 80196



Post adjustment screwdriver 4822 395 50275

Testcassette 4822 397 30103

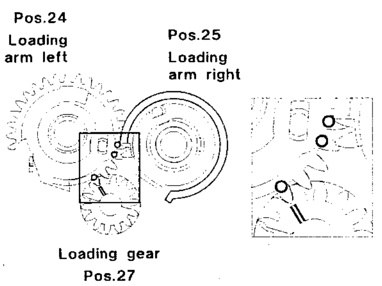
Nylon gloves 5322 395 94022

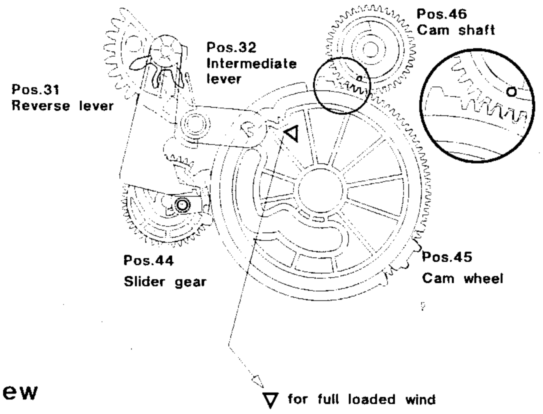
4.1.1 Deck lay out diagram

Deck in position „threaded out".

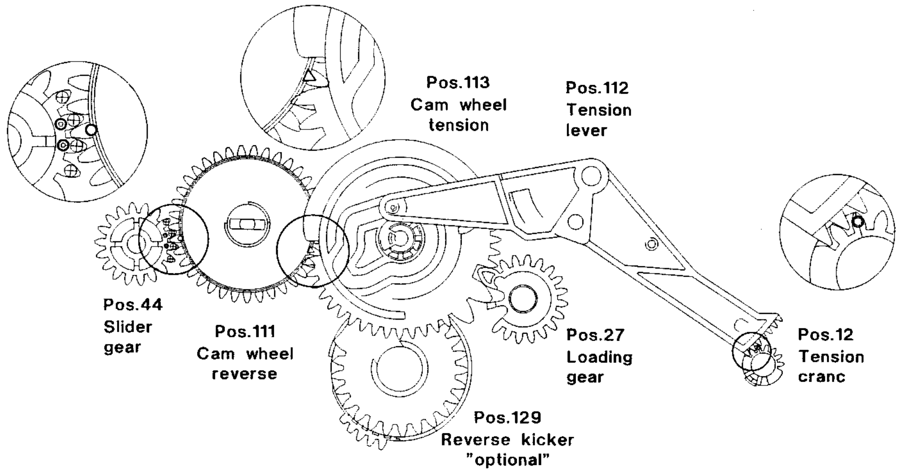
The following diagrams indicate the relative position of the gearwheels and levers when the deck is in the threaded out (cassette-compartment down) position.

Top view


Pos.24
Loading
arm left
Pos.25
Loading
arm right
Loading gear
Pos.27


Pos.46
Cam shaft
Pos.32
Intermediate
lever
Pos.31
Reverse lever
Pos.44
Slider gear
Pos.45
Cam wheel
∇ for full loaded wind

Underside view


Pos.113
Cam wheel
tension
Pos.112
Tension
lever
Pos.44
Slider
gear
Pos.111
Cam wheel
reverse
Pos.27
Loading
gear
Pos.12
Tension
cranc
Pos.129
Reverse kicker
"optional"

4.1.2 The Lift

Refitting the lift compartment:
Ensure the lift compartment is down and gear A is rotated one click stop anticlockwise from the down position.
The removal and refitting of the lift can be carried out in all deck positions with the exception of „eject" (ensure that gears 103/105 are free).

To remove the lift:
Free the holding bracket (Fig. 2) by rotating it up and back from the upper end.
Unscrew the 4 screws on the underside of the deck.
Carefully remove the lift vertically, noting the position of the record protect operating lever.

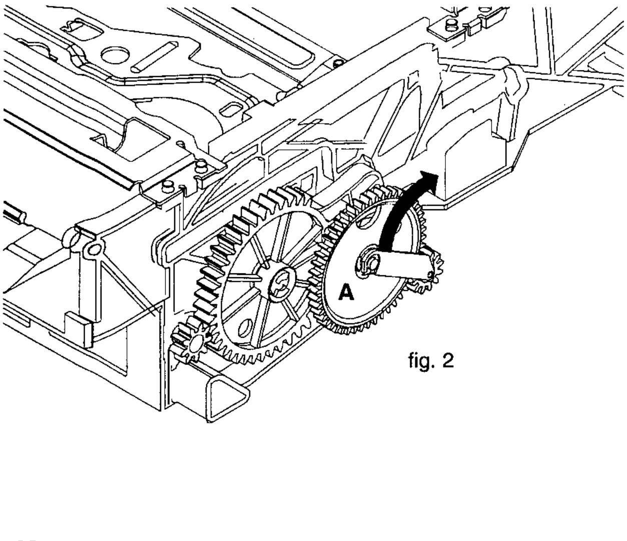


fig. 2

4.1.3 Head disc replacement

Removal :
Nylon gloves should be worn when handling the head disc.
Turn the headdisc until the long hole of the rotor appears in the bigger hole of the scannermotor
Insert the reference pin C (included with each service head disc) through the bigger hole of the lid of the scanner motor until the pin snaps in the long hole of the rotor. (Fig. 3)

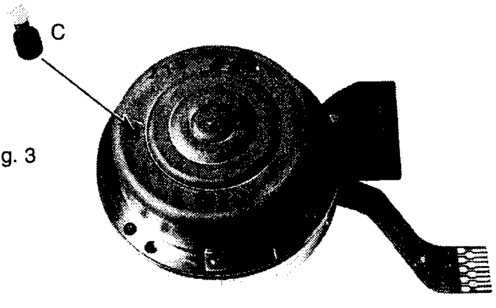
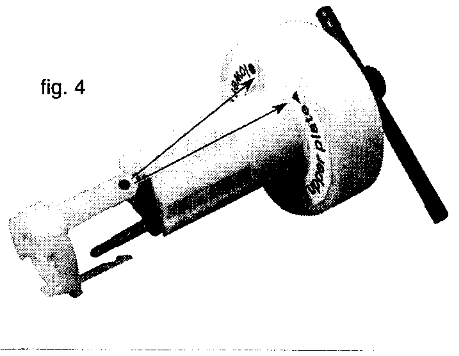
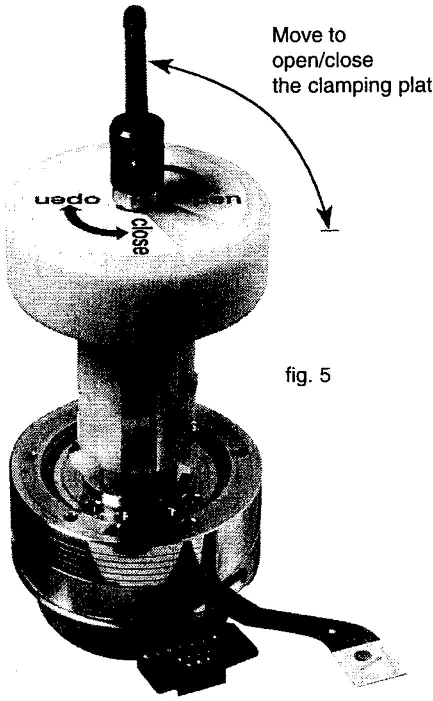


fig. 3

Important:
Choose Installation/Removal of the upper/lower clamping element by turning and attaching the reference element to the tool. (Fig. 4)

fig. 4





Move to open/close the clamping plate

Position the tool on the upper clamping element, loosen the clamping element by turning the lever 90 degrees and remove it from the head disc. (Fig. 5)

fig. 5

Prepare the tool for the lower clamping element.Position the tool on the head disc and make sure that all 3 pins are snapped in the the lower clamping element. Loosen the clamping element by turning the lever 90 degrees and remove the head disc plus the tool from the scanner spindle. (Fig.6)

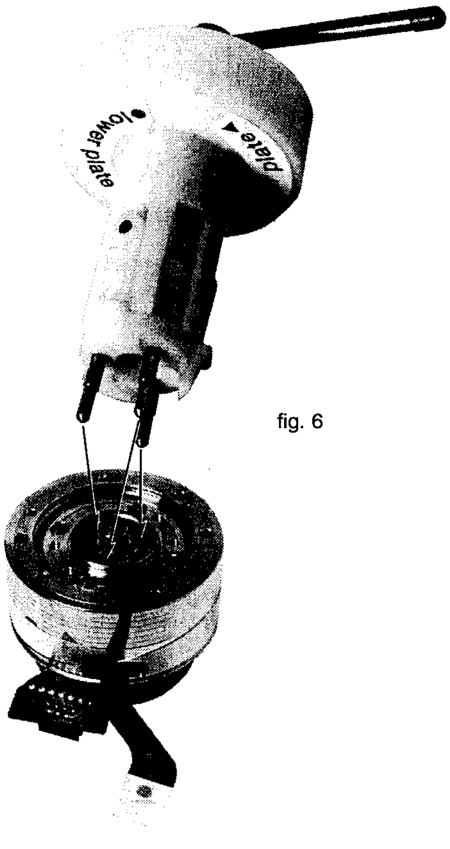


fig. 6

Installation:
Before carrying out the installation of the new head disc make sure that the scanner motor spindle is clean and undamaged. (The spindle has to be free of grease and must not be touched with bare hands)
Insert the 2 Mylar foils (included with each head disc) in the head disc. (Fig.7)

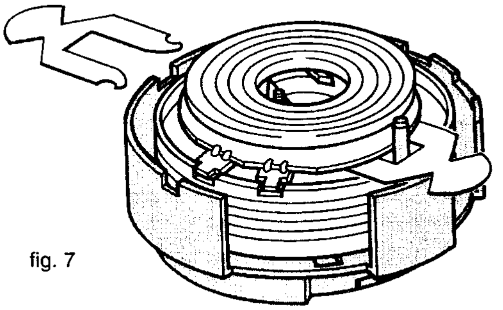


fig. 7

Position the tool (reference: lower clamping element) on the new headdisc (with protective cover) and loosen the lower clamping element.
Position the head disc so that pin D of the protective cover engages in the hole of the stator (the arrow on the protective cover must point towards the scanner print). (Fig. 8)

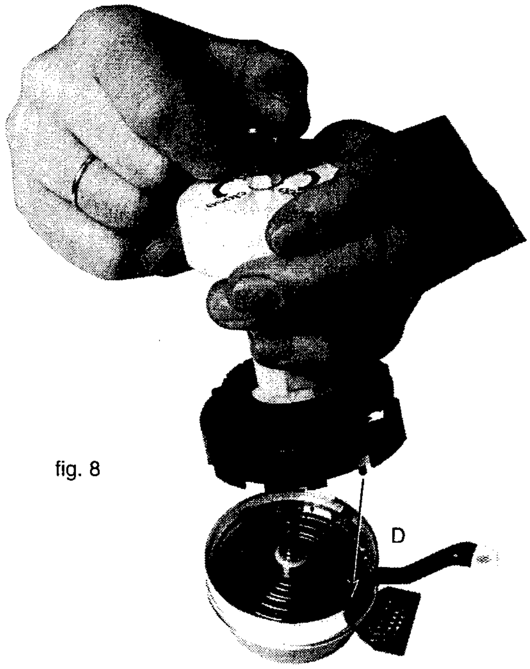


fig. 8

Reach the exact position through pressing the tool down with a force of 1 N. and fix the lower clamping element by turning the lever towards „close“.
Remove the tool.
Change the tool to „upper clamping element“ and position the clamping element exactly. (Fig. 9)

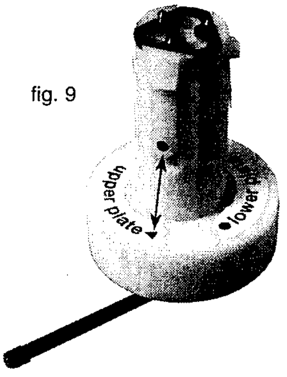


fig. 9

Tighten the clamping element through turning the lever towards „open“.
Position the tool planely on the head disc and fix the clamping element. (Fig.5 „close“)
Remove the protecting cap from the head disc, withdraw the two Mylar foils and remove the reference pin C.

After replacing the head disc, carry out the following adjustments and checks :
Head switching pulse (gap position, chapter 3)
Write current adjustments (chapter 3)
Check tape path alignment (see paragraph 4.2.1.)

4.1.4 A/C Head (Combi head) (Pos. 36)

Remove the fixing spring (A) (fig. 10)
Remove the fixing screw and replace the A/C head.
Use a new fixing spring (included with new A/Chead) for reassembly.

After the A/C head has been replaced, all adjustments described in paragraph 4.2.1.2 and paragraph 4.2.2 have to be carried out.

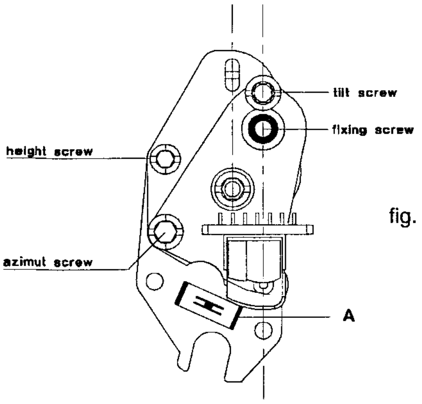


fig. 10

4.1.5 Threading motor (Pos. 38)

Remove the belt and disconnect the connector plug.
Remove the threading motor from the motor supports (Fig. 11).

During reassembly ensure that the threading motor is correctly located in the front and rear supports.

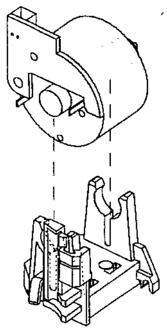


fig. 11

4.1.6 Capstan motor (Pos. 127)

Remove the tape deck.
Remove the belt (pos.126) on the underside;
Remove the three capstan motor fixing screws (Fig. 12) and withdraw the capstan motor downward from the drive assy.
The reassembly is carried out in reverse order. Make sure that the capstan is free of grease.

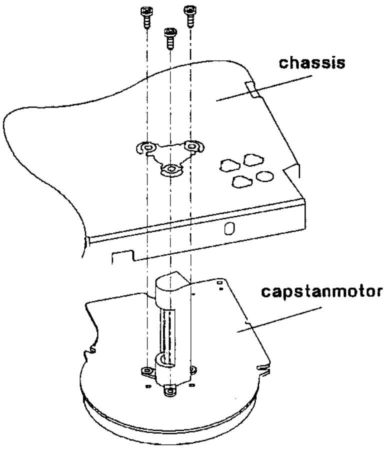


fig. 12

4.1.7 Pressure roller (Pos. 37)

Remove the tape deck
Unhook and remove the pressure roller tension spring.
Release the pressure roller guide (pos. 41) from the guide in the threading motor holder by pressing the top of the motor guide rearwards and rotating the pressure roller guide assembly clockwise by approximately a quarter of a turn (Fig. 13) The pressure roller and guide can now be lifted clear.

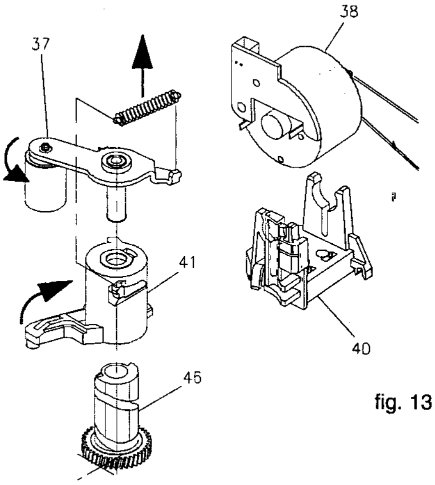
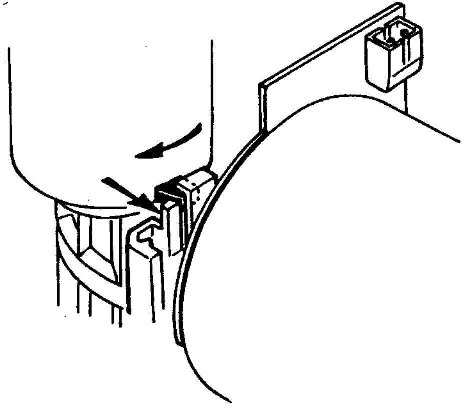


fig. 13



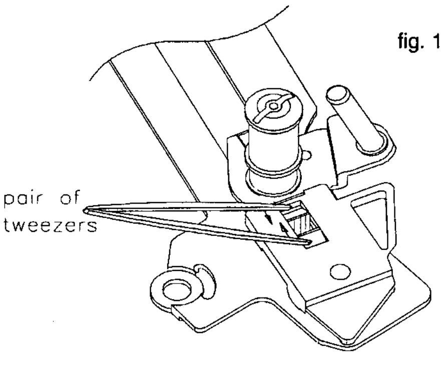
Ensure that no grease from the pressure roller guide gets to the capstan or pressure roller.
The reassembly is carried out in reverse order.

4.1.8 Roller unit right (Pos. 26)

Remove the tape deck.
Compress the two snap hooks by means of a pair of tweezers and remove the roller assy from the roller unit right (Fig. 14).
Unhinge the loading arm right from the holding plate and push the latter towards the front of the deck to remove from the guide (right).

NOTE: During reassembly ensure the link from 25 is engaged in the hole of the holder plate 26.
After replacing the roller unit (right), the tape path has to be checked, and adjusted if necessary (paragraph 4.2.1).

fig. 10



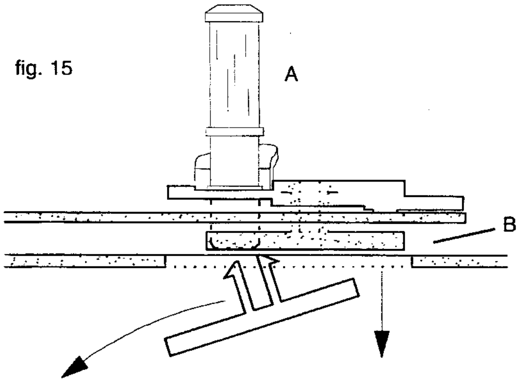
4.1.9 Roller unit left (Pos.23)

Set the drive assy to „Eject“ position.
Unhook the tension arm spring (pos. 11), to avoid the tension arm spring being pre-loaded.
At the bottom side of the drive assy remove the tension lever (pos.112).
Compress the two snap hooks by means of a pair of tweezers (Fig. 9)and remove the roller assy (A) from the plate (B).
Unhinge the loading arm (left) from the holding plate and remove the latter downward from the drive assy through the recess in the chassis (Fig. 15).
The reassembly is carried out in reverse order.

NOTE : During reassembly
1. Place the carriage holding plate in the assembly with the half-round cutout nearest the rear of the deck.
2. When the loading arm is refitted ensure the pin on the underside of 23 is through the link of 24B.

After replacing the roller unit (left) the tape path has to be checked (paragraph 4.2.1.), and adjusted if necessary.

fig. 15

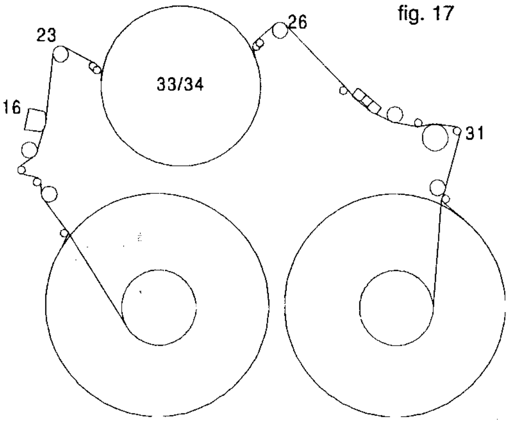


4.2 Adjustments

Adjustments must not be made in the service position.

4.2.1 Tape path

fig. 17


23
26
33/34
16
31

4.2.1.1 Roller left unit/roller unit right

Preparation:
Connect one input of a dual trace oscilloscope to observe the tape sync pulse CTL (pos.7460 IC SAA1310 pin16). The other input (DC coupled) to observe the tracking information TRIV.
Trigger the oscilloscope externally on the head pulse HP1 ("SWIN").
Playback the black and white section of the alignment test tape.
Set the deck in the condition where the video heads are running along the upper edge of the tracks only by:

1. Call the service test program (chapter 2.1)
2. Activate manual tracking (service test program step 03) and watch the tape sync pulse move to the left in relation to the TRIV signal.
3. Note the extreme left hand position reached by the sync pulse, repeat as necessary.
4. Stop the movement of the pulse when the TRIV signal reduces to 1/2 to 2/3 maximum amplitude by pressing the normal play button. A noisy picture (disturbances) is visible on the TV set and the CTL pulse should be to the left of the display.
The recorder will hold this position until the service test progam step 03 is left.
This condition works only if X-distance is adjusted.

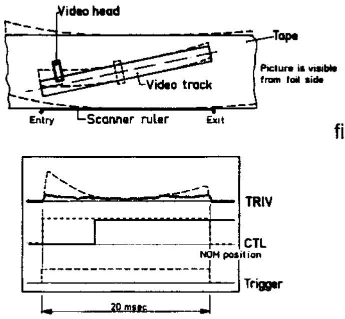

Video head
Tape
Picture is visible from foil side
Video track
Entry
Scanner ruler
Exit
TRIV
CTL
NOM position
Trigger
20 msec

fig. 18

Adjustment:
Adjust the left and right roller units to make the tracking signal TRIV straight and flat as possible (Fig. 18).

4.2.1.2 A/C Combi head

Tilt angle adjustment

Set the drive to feature mode (e.g. +7)
Adjustment :
By means of the tilt angle adjusting screw move the tape until the lower edge just touches the tape guide A1 (see Fig. 19) the tape must not be distorted at the lower edge (by pressing onto guide).

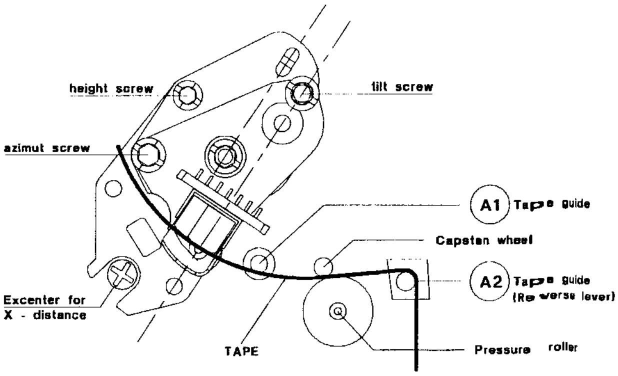

height screw
tilt screw
azimut screw
A1 Tape guide
Capstan wheel
A2 Tape guide (Reverse lever)
Excenter for X - distance
TAPE
Pressure roller

fig.19

Adjustment of the azimuth angle and the head height

Connect an oscilloscope to the linear Audio output.
Play the section of the test cassette with the audio signal 400 Hz.
Adjust for maximum output voltage by means of the height adjustment screw
Play the section of the test cassette with the audio signal 8 kHz.
Adjust to maximum output voltage by means of the azimuth adjustment screw (Fig. 19).
If necessary, repeat this procedure
Check the tilt angle adjustment

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, it is possible, that the adjustments described in paragraph 4.2.1.1 and paragraph 4.2.1.2 have to be repeated several times.

4.2.2 Adjustment of the horizontal distance (x-distance)

Before this adjustment is carried out, insert the test cassette (start from Eject position). Call the service test program (tracking value will take up its nominal position) and press the „play" button. Playback the black/white part of the test cassette.)
Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the excentric screw (Fig.19).

4.2.3 Brake band and tape tension

Due to further development it is no longer necessary to make theseadjustments after replacement of the brake band.
If the brake band or tape tension are completely misadjusted, set them to a center position; set the drive to „play" and adjust the brake band until the edge of the elbow of the tape tension arm is aligned with the left inner edge of the left guide (fig. 20).

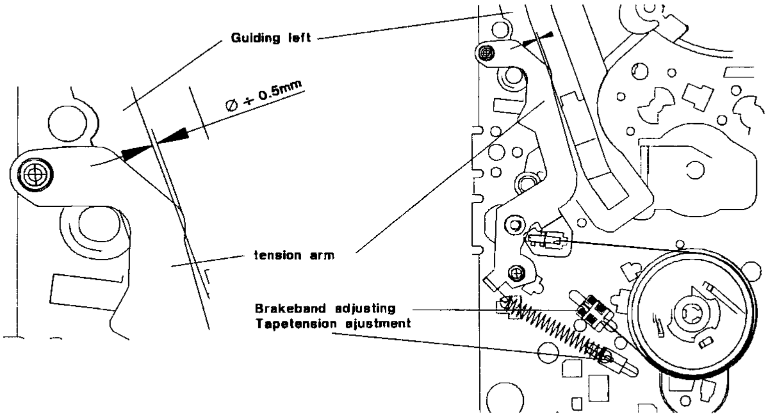
4.2.4 Friction clutch control check

Set the drive to „Play" position.
Place the torquemeter on the right reel.
Turn the capstan motor to move the right reel clockwise.
Keep turning, until the indication at the torquemeter no longer changes (Fig. 21)
The torque has to be 10,5 mNm +/-25% (105gFcm +/-25%)

4.2.5 Reverse brake control

Set the drive to „Reverse" position.
Place a torquemeter on the right reel and turn the latter counterclockwise, until the reel just starts to flip.
The value indicated at the torquemeter has to be 7mNm +/-3mNm (70 gFcm +/-30gFcm) (Fig. 21).

fig. 20



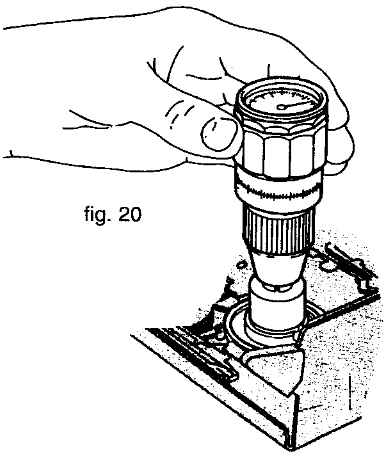
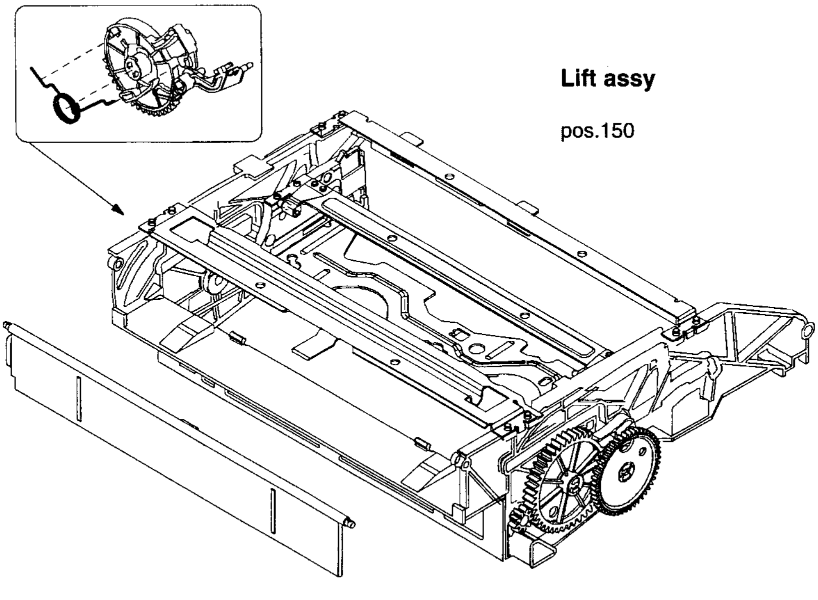


fig. 20

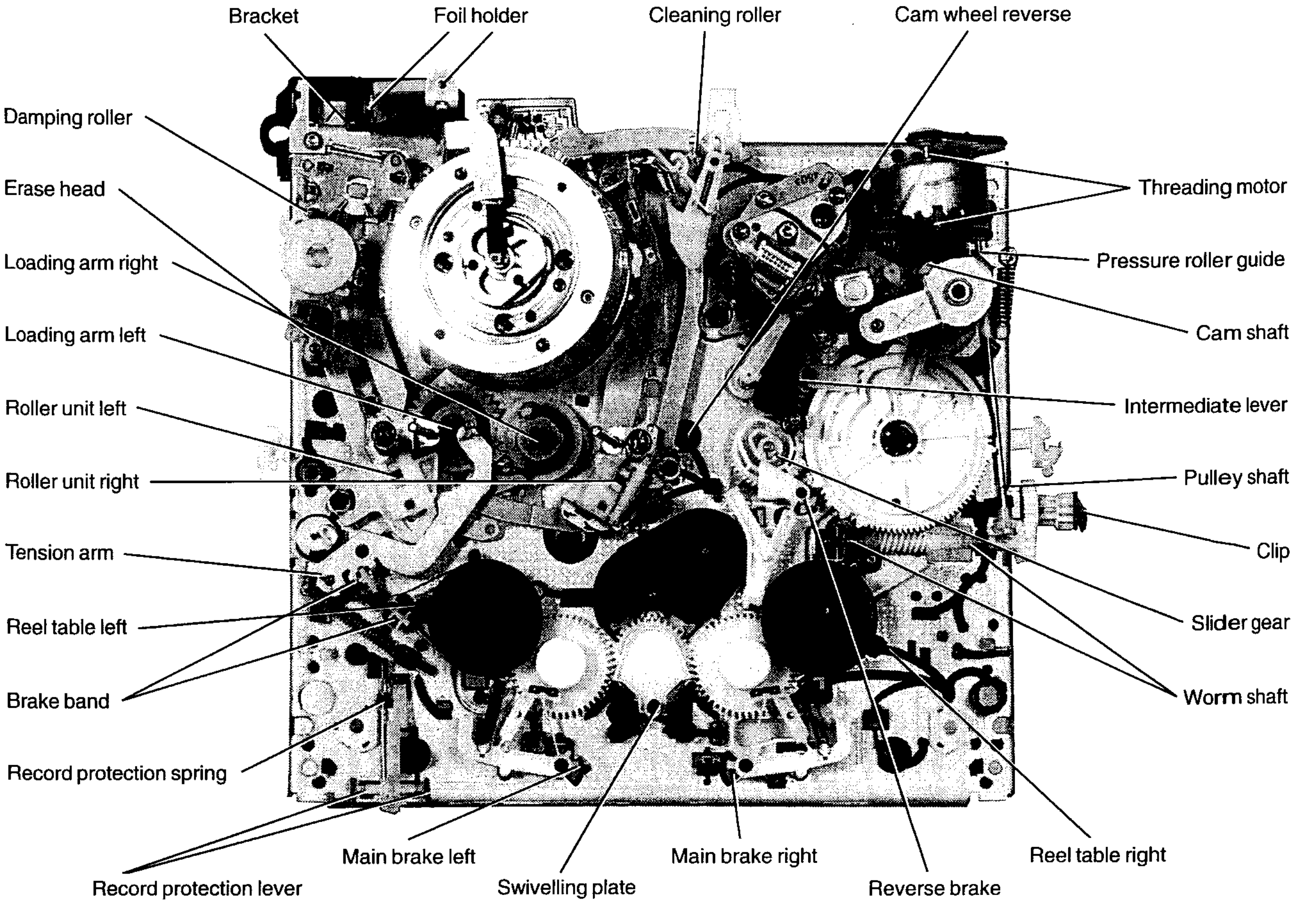


Lift assy

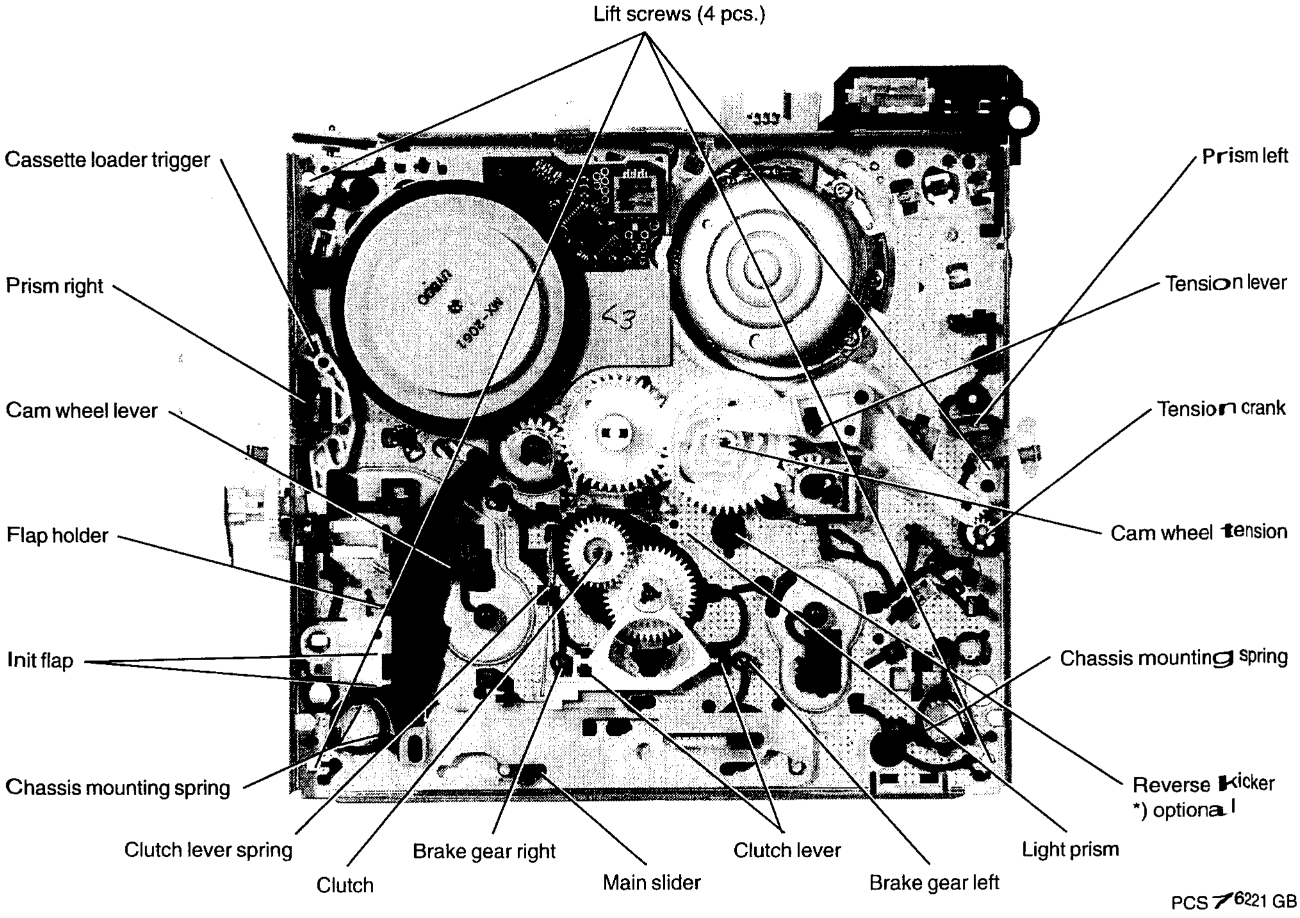
pos.150

In order to make the replacement of the deck parts easier, the snap hooks are marked with an arrow.

TOP VIEW

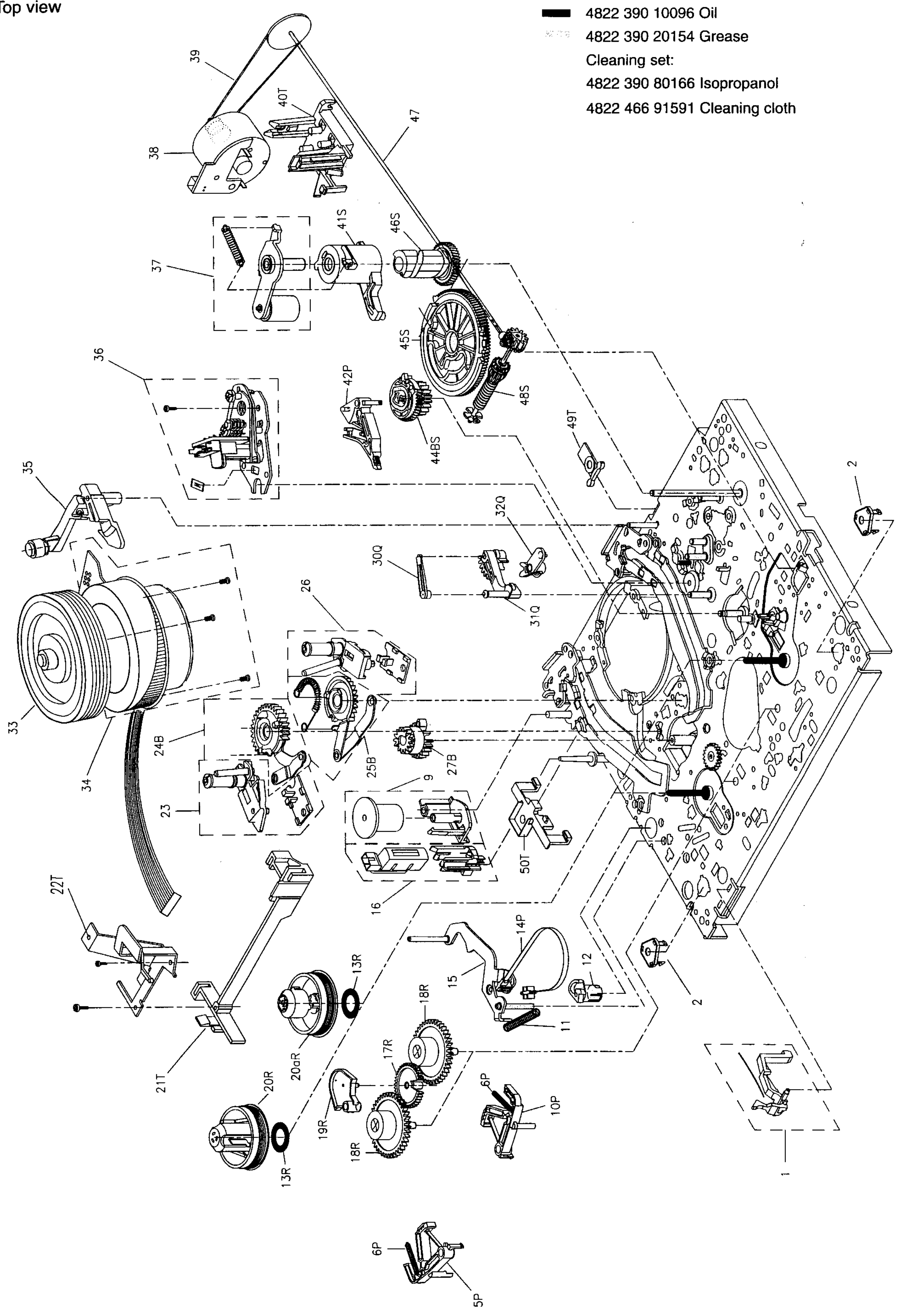

Bracket
Foil holder
Cleaning roller
Cam wheel reverse
Damping roller
Erase head
Loading arm right
Loading arm left
Roller unit left
Roller unit right
Tension arm
Reel table left
Brake band
Record protection spring
Threading motor
Pressure roller guide
Cam shaft
Intermediate lever
Pulley shaft
Clip
Slider gear
Worm shaft
Main brake left
Record protection lever
Swivelling plate
Main brake right
Reverse brake
Reel table right

UNDERSIDE VIEW


Lift screws (4 pcs.)
Cassette loader trigger
Prism right
Cam wheel lever
Flap holder
Init flap
Chassis mounting spring
Prism left
Tension lever
Tension crank
Cam wheel tension
Chassis mounting spring
Reverse kicker
*) optional
Light prism
Clutch lever spring
Clutch
Brake gear right
Main slider
Clutch lever
Brake gear left

4.2 Exploded view

Top view


39
40T
47
38
41S
46S
37
45S
42P
48S
36
44BS
49T
2
35
32Q
30Q
26
31Q
33
34
24B
25B
27B
9
23
50T
16
22T
14P
12
15
13R
18R
11
2
17R
20aR
21T
6P
10P
20R
19R
18R
13R
1
6P
5P

▬ 4822 390 10096 Oil

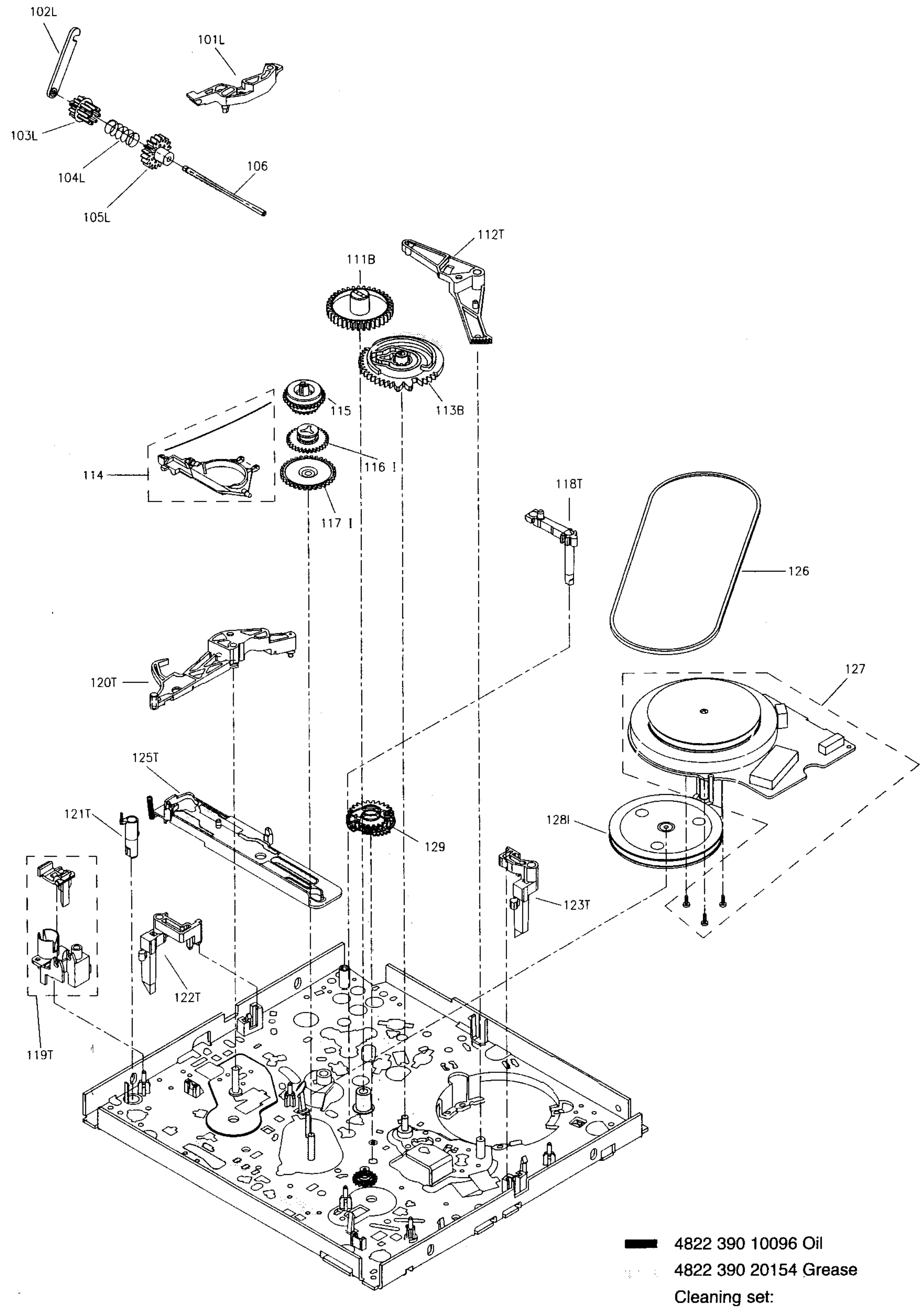
▨ 4822 390 20154 Grease

Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth

Underside view


102L
101L
103L
104L
106
105L
112T
111B
115
113B
116 !
114
117 !
118T
126
120T
127
125T
121T
128I
129
123T
122T
119T

▬ 4822 390 10096 Oil

░ 4822 390 20154 Grease

Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth

4. DRIVE ASSEMBLY

4.1 MECHANICAL PARTS LIST

Pos.	Description	KITS								Code number 4822
		B	I	L	P	Q	R	S	T	
1	Rec. protection lever (with spring)									402 10202
2	Chassis mounting spring (2x)									492 71022
5	Main brake left				P					
6	Main brake spring (2x)				P					
9	Damping roller *)									528 70782
10	Main brake right				P					
11	Tension arm spring									492 33317
12	Tension crank									403 70551
13	Slip ring						R			
14	Tension band				P					
15	Tension arm									403 70547
16	Erase head									249 10522
17	Swivelling gear						R			
18	Brake gear (2x)						R			
19	Swivelling plate						R			
20	Reel table (S)						R			
20a	Reel table (T)						R			
21	Headamplifier holder								T	
22	Bracket								T	
23	Roller unit left									528 70771
24	Loading arm left	B								
25	Loading arm right	B								
26	Roller unit right									528 70772
27	Loading gear	B								
30	Reverse clip					Q				
31	Reverse lever					Q				
32	Intermediate lever					Q				
33	Head disc 4/2 (/1)									691 10548
33	Head disc 4/2 (/1)Secam									691 10551
34	Scanner motor 4/2 (with screws)									361 10901
35	Cleaning roller									528 70773
36	A/C Head (with clip and screws)									249 10468
37	Pressure roller (with spring)									528 70774
38	Threading motor									361 10809
39	Threading belt									358 20421
40	Motor holder								T	
41	Pressure roller guide							S		
42	Reverse brake				P					
44	Slider gear	B						S		
45	Cam wheel							S		
46	Cam shaft							S		
47	Pulley shaft									528 81462
48	Worm shaft							S		
49	Chassis mounting clip								T	
50	WD-holder								T	

Pos.	Description	KITS								Code number 4822
		B	I	L	P	Q	R	S	T	
101	Cassette loader trigger			L						
102	Clip			L						
103	Cassette loader gear1			L						
104	Cassette loader spring			L						
105	Cassette loader gear2			L						
106	Spindle									535 93277
111	Cam wheel reverse	B								
112	Tension lever								T	
113	Cam wheel tension	B								
114	Clutch lever (with spring)									403 70549
115	Clutch									528 20736
116	Changing gear		I							
117	Double gear		I							
118	Light prism								T	
119	Init flap and holder								T	
120	Cam wheel lever								T	
121	S-VHS lever								T	
122	Prism rihgt								T	
123	Prism left								T	
125	Main slider								T	
126	Driving belt									358 31166
127	Capstan motor (with screws)									361 10805
129	Reverse kicker with transmission gears *)									522 20451
128	Gear pulley		I							
150	Lift									443 64112
KIT	B									310 31955
KIT	I									310 31963
KIT	L									310 32116
KIT	P									310 32191
KIT	Q									310 10658
KIT	R									310 10659
KIT	S									310 10661
KIT	T									310 10662

*) optional

Um eine hohen Reparaturstandard zu gewährleisten sind mit Ausnahme von Kit T immer alle im Kit enthaltenen Teile zu tauschen.

In order to guarantee a high repairstandard all spare parts included in a kit have to be replaced with the exception of kit T.

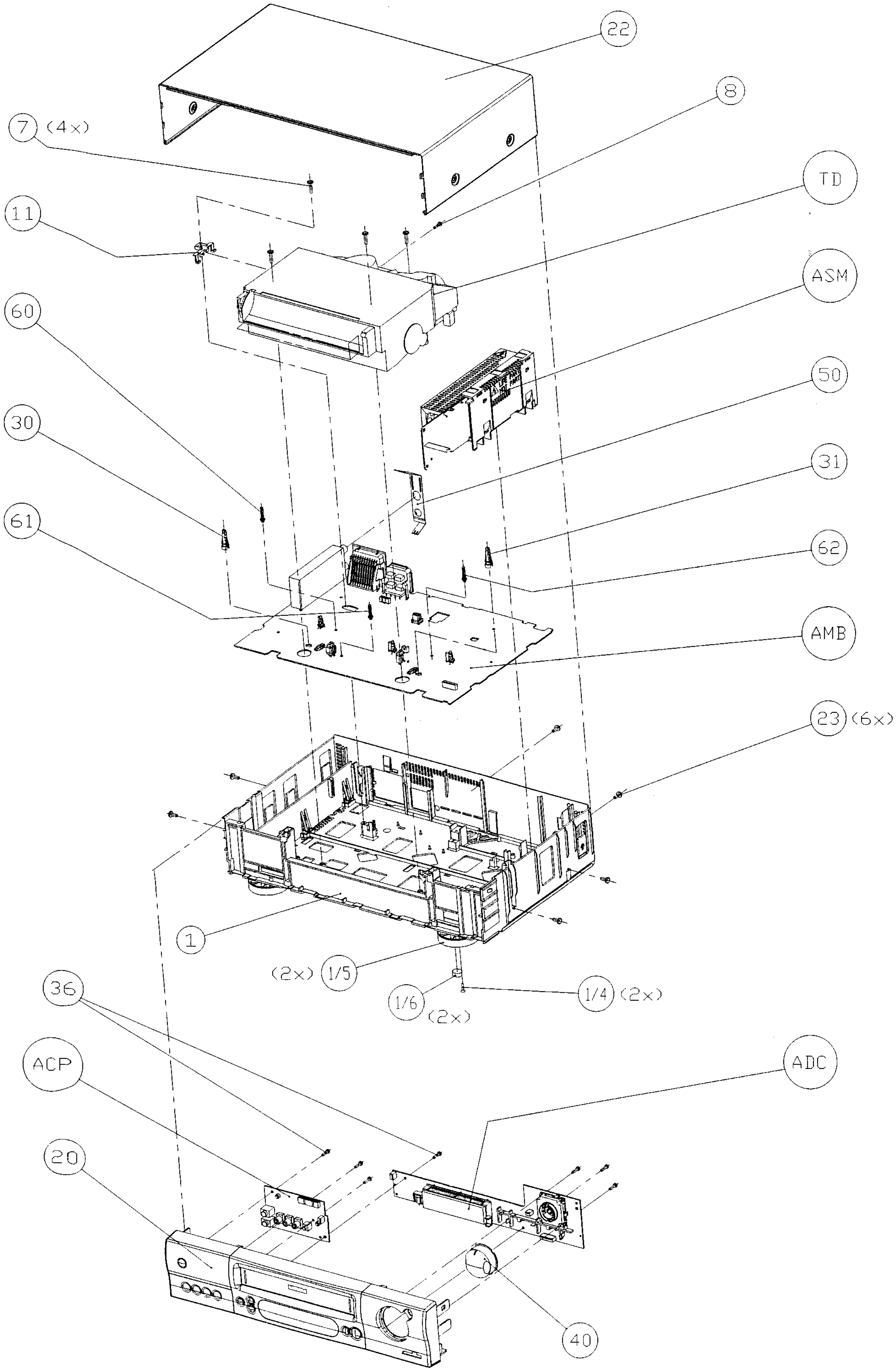
Per una riparazione garantita occorre sostituire tutti i pezzi contenuti nei kit, fatta eccetione per il kit T.

Para obtener un estandár de reparaciones elevado,es necesario cambiar todas las partes contenidas en el kit, la única exceptiónes para el kit T.

A fin d'obtenir un standard de réparations élevé, toutes les pièces de rechange incluses dans un kit sont à remplacer, exception faite du kit T.

Om een hoge reparatiekwaliteit te waarbogen moeten, met uitzondering van kit T, altijd alle zich in een kit bevindende onderdelen worden vervangen.

Exploded View of the Set & Mechanical Parts


22
8
7 (4x)
TD
11
ASM
60
50
30
31
61
62
AMB
23 (6x)
1
(2x) 1/5
1/6 (2x)
1/4 (2x)
36
ACP
ADC
20
40

Set Parts List

Position	Code Number	Description
1	4822 464 10465	FRAME ASSY
1/4	4822 502 11838	SCREW P2,9X12
1/5	4822 462 11114	FOOT ASSY
1/6	4822 462 41806	FOOT RUBBER INLAY
7	4822 502 13884	SCREW 3,5X16
8	4822 502 14431	SCREENING SCREW
11	4822 256 10504	TD-HOLDER
20	4822 426 10695	CONTROL PANEL ASSY VR800/02/16/58
20	4822 426 10696	CONTROL PANEL ASSY VR800/07
20	4822 426 10697	CONTROL PANEL ASSY VR800/39
20	4822 426 10739	CONTROL PANEL ASSY VR805/071
20	4822 426 10738	CONTROL PANEL ASSY VR805/161
20	4822 426 10737	CONTROL PANEL ASSY VR805/391
20	4822 426 10698	CONTROL PANEL ASSY VR850/02/16/58
20	4822 426 10699	CONTROL PANEL ASSY VR850/07
20	4822 426 10701	CONTROL PANEL ASSY VR850/39
20/6	4822 443 11044	LIFT FLAP ASSY VR800
20/6	4822 443 11085	LIFT FLAP ASSY VR805
20/6	4822 443 11048	LIFT FLAP ASSY VR850
20/7	4822 492 70896	LEG SPRING LIFT FLAP
20/11	4822 502 11839	SCREW 2,9X8
20/13	4822 443 11045	FLAP ASSY LEFT VR800/02
20/13	4822 443 11046	FLAP ASSY LEFT VR800/07
20/13	4822 443 11047	FLAP ASSY LEFT VR800/39
20/13	4822 443 11086	FLAP ASSY LEFT VR805/071
20/13	4822 443 11084	FLAP ASSY LEFT VR805/161
20/13	4822 443 11083	FLAP ASSY LEFT VR805/391
20/13	4822 443 11049	FLAP ASSY LEFT VR850/02
20/13	4822 443 11051	FLAP ASSY LEFT VR850/07
20/13	4822 443 11052	FLAP ASSY LEFT VR850/39
20/14	4822 417 11384	HINGE LEFT
20/15	4822 417 11385	HINGE RIGHT
22	4822 442 01513	COVER LAQUERED VR850
22	4822 442 01567	COVER LAQUERED VR805
22	4822 442 01511	COVER LAQUERED VR800
23	4822 502 14109	PLASTITE SCREW 3,5X1
30, 31	4822 256 10198	DISTANCE HOLDER DECK
36	4822 502 11838	SCREW P2,9X12
40	4822 410 11973	SHUTTLE KNOB ASSY
50	4822 492 11687	SPRING
60, 61, 62	4822 256 10359	DISTANCE HOLDER MOBO

Power Supply ASM

MISCELLANEOUS

1115	4822 267 51466	17P. Connector
1150 ▲	4822 267 31064	Mains Connector
1151 ▲	4822 070 31252	Fuse 1.25A
1152	4822 252 11215	Surge Protector
1153 ▲	4822 071 51001	Fuse 100mA

CAPACITORS

2150 ▲	4822 121 10512	220	nF	275V
2151	4822 121 10789	100	nF	400V
2152	4822 124 11561	47	µF	400V
2153 ▲	4822 126 14088	2,2	nF	250V
2154	4822 124 80604	47	µF	50V
2155	4822 121 43526	47	nF	250V
2156	4822 126 14126	47	pF	2KV
2157	4822 126 14126	47	pF	2KV
2158	4822 126 13614	4	nF	50V
2159	5322 122 32331	1	nF	100V
2160	5322 121 42386	100	nF	63V
2161	4822 121 70647	680	pF	100V
2162	5322 121 42386	100	nF	63V
2163	4822 124 40433	47	µF	25V
2164	4822 124 81029	100	µF	25V
2165	4822 124 12284	470	µF	
2166	4822 124 12284	470	µF	
2167	4822 124 12284	470	µF	
2168	4822 121 70162	10	nF	400V
2170	4822 124 80604	47	µF	50V
2172	4822 126 13614	4	nF	50V
2173	4822 124 12285	2200	µF	
2174	4822 124 12181	1000	µF	6,3V
2175	5322 121 42386	100	nF	63V

RESISTORS

3150	4822 116 21227	VDR		
3151 ▲	4822 053 21335	3,3	M	0,5W
3152	4822 116 83872	220	R	0,5W
3153 ▲	4822 053 21335	3,3	M	0,5W
3154 ▲	4822 053 21335	3,3	M	0,5W
3155 ▲	4822 052 10109	10	R	0,33W
3156	4822 053 11123	12	k	2W
3157 ▲	4822 052 10102	1	k	0,33W
3158 ▲	4822 052 10479	47	R	0,33W
3159	4822 116 52199	68	R	0,5W
3160	4822 116 83883	470	R	0,5W
3161	4822 116 52249	1,8	k	0,5W
3162	4822 116 52304	82	k	0,5W
3163	4822 116 52303	8,2	k	0,5W
3164	4822 116 52256	2,2	k	0,5W
3165	4822 116 52283	4,7	k	0,5W
3166	4822 116 52257	22	k	0,5W
3167	4822 050 23902	3,9	k	0,6W
3168	4822 116 52244	15	k	0,5W
3169	4822 050 21003	10	k	0,6W
3170	4822 116 83883	470	R	0,5W
3171	4822 050 21008	1	R	0,6W
3172	4822 116 52176	10	R	0,5W
3175	4822 116 83872	220	R	0,5W
3176	4822 050 11002	1	k	0,4W
3177	4822 116 83864	10	k	0,5W
3178	4822 050 25602	5,6	k	0,6W
3179	4822 101 11383	470, 3	R	
3180	4822 050 24702	4,7	k	0,6W
3181	4822 116 52176	10	R	0,5W
3182	4822 116 52176	10	R	0,5W
3183	4822 116 83868	150	R	0,5W
3184	4822 116 83864	10	k	0,5W
3185	4822 116 52228	680	R	0,5W
3186	4822 050 11002	1	k	0,4W
3187	4822 116 83883	470	R	0,5W
3188	4822 116 83874	220	k	0,5W
3189	4822 116 83884	47	k	0,5W
3190	4822 050 11002	1	k	0,4W
3191 ▲	4822 052 10479	47	R	0,33W
3192	4822 116 52276	3,9	k	0,5W
3193	4822 116 52297	68	k	0,5W
3194	4822 116 52283	4,7	k	0,5W
3195 ▲	4822 052 10478	4,7	R	0,33W
3196	4822 116 52228	680	R	0,5W
3197	4822 116 52235	1	M	0,5W
3198	4822 116 83874	220	k	0,5W
3199	4822 050 23309	33	R	0,6W

COILS

5150 ▲	4822 157 10454	LINE FILTER CHOKE (TDK)
5151 ▲	4822 146 11056	TRANSF. SRW32ES
5153	4822 157 11736	IND FXD BEAD 150MHZ 1K B
5154	4822 157 51462	10µH
5155	4822 157 53005	0,33µH 20%
5156	4822 157 11737	22µH 10% 9X9,5

DIODES

6151	4822 130 31603	1N4006
6152	4822 130 31603	1N4006
6153	4822 130 31603	1N4006
6154	4822 130 31603	1N4006
6155	4822 130 31878	1N4003G
6156	4822 130 31878	1N4003G
6157	4822 130 42606	BYD33J
6158	4822 130 31878	1N4003G
6159	4822 130 31878	1N4003G
6160	4822 130 31603	1N4006
6161	4822 130 31983	BAT85
6162	4822 130 33948	MTZJ5.6B
6163	4822 130 33948	MTZJ5.6B
6164	4822 130 83909	BYW98-200RL
6165	4822 130 83909	BYW98-200RL
6166	5322 130 31938	BYV27-200
6167	4822 130 42488	BYD33D
6168	4822 130 34142	BZX79-B33
6169	4822 130 42488	BYD33D
6170	4822 130 32715	SB340
6172	4822 130 30621	1N4148
6173	4822 130 30621	1N4148
6174	4822 130 30621	1N4148

TRANSISTORS & IC's

7150	4822 130 63722	STP3NA60FI-1153
7151	4822 209 90025	MC44603P
7152 ▲	4822 209 32126	SOC1012T
7153	4822 209 81397	TL431CLPST
7154	4822 130 41246	BC327-25
7155	4822 130 41246	BC327-25
7156	4822 130 40959	BC547B
7157	4822 130 40959	BC547B
7158	4822 130 10214	STD17N06
7159	4822 130 40959	BC547B
7160	4822 130 41782	BF422
7161	4822 130 41246	BC327-25

REPAIR KITS

4822 310 11237	POWER SUPPLY REPAIR KIT

▲... Safety component, use only this type

Motherboard

MISCELLANEOUS

7	4822 256 10195	REEL TABLE TACHH. DECK
8	4822 256 10196	TACHO-HOLDER
20	4822 256 10197	MOBO SENSOR-HOLDER DECK
21	4822 256 10197	MOBO SENSOR-HOLDER DECK
22	4822 256 10197	MOBO SENSOR-HOLDER DECK
1001	4822 242 10695	4 433 619 MHZ
1322 ⚠	4822 071 55001	Fuse 500mA
1323 ⚠	4822 071 51002	Fuse 1A
1324 ⚠	4822 071 55001	Fuse 500mA
1325 ⚠	4822 071 51002	Fuse 1A
1451	4822 242 10956	20MHZ 20P AT-49
1460	4822 277 11521	SWITCH 1 ASSY DECK
1461	4822 277 11521	SWITCH 1 ASSY DECK
1701	4822 242 81854	SAW Filter G9353M for PAL BG
1701	4822 242 10306	OFW K9463M PAL I, P/SEC DK
1701	4822 242 10688	OFW K9456M for SECAM L
1702	4822 242 10307	OFW G3956M for PAL BG/DK
1702	4822 242 81436	OFW K3953M for PAL I, SEC L
1703	4822 242 10428	EFCT5R5YS5A, not for PAL I
1703	4822 242 70279	SFE6,0MB for PAL I
1704	4822 242 10429	EFCT6R5YS5A for PAL/SEC DK
1704	4822 242 70279	SFE6,0MB, for SECAM L
1705	4822 242 72586	TPS5,5MB-TF20, not for PAL I
1705	4822 242 81572	TPS6,0MB-TF21, for PAL I
1706	4822 242 10563	EFCT5R74YS5A
1707	4822 242 10754	EFCT6R25YS5A
1709	4822 210 10833	BOOSTER PLT for SECAM L
1709	4822 210 10832	Tumod VHF/UHF, PAL-B/G
1709	4822 210 10834	Tumod VHF/UHF PAL I
1709	4822 210 10835	Tumod VHF/UHF Modul. D/K
when changing Tumod order also spring 4822 492 11687		
1911	4822 267 10364	CONN. 9P
1942	4822 267 10871	17POL. FEM.
1944	4822 267 51255	14 P
1946	4822 267 10366	CAPSTAN-MOBO-SOCKEL
1947	4822 267 10957	CONN. 3P
1948	4822 267 41062	6 pin
1951	4822 265 11422	SCART CONN BLACK 7133
1952	4822 264 10346	SCART CONN. BLUE 7135D
1954	4822 265 41077	CINCH connector
1956	4822 267 10953	CONN. 7P
1957	4822 267 10584	CONN. 1P
1960	4822 267 10953	CONN. 7P
1961	4822 267 10954	CONN. 5P
1964	5322 268 90415	B2B-PH-K
1971	4822 242 82059	ZAK2863 (10MHZ)
1991	4822 267 10957	CONN. 3P

CAPACITORS

2000	4822 126 10002	100	nF	25V
2001	4822 122 33177	10	nF	50V
2002	4822 122 33177	10	nF	50V
2003	4822 122 33177	10	nF	50V
2004	4822 126 13836	10	A	50V
2005	4822 126 13836	10	A	50V
2006	4822 122 33177	10	nF	50V
2007	4822 122 33177	10	nF	50V
2008	4822 126 10002	100	nF	25V
2009	4822 122 33177	10	nF	50V
2010	5322 122 31873	2,7	pF	100V
2011	4822 126 10002	100	nF	25V
2012	4822 126 13751	47	nF	63V
2013	5322 122 32654	22	nF	63V
2014	4822 126 10002	100	nF	25V
2015	4822 124 22651	1,0	µF	50V
2016	4822 126 13296	100	nF	16V
2017	4822 126 13836	100	A	16V
2018	4822 124 21732	10	µF	25V
2019	4822 124 21732	10	µF	25V
2020	4822 122 33177	10	nF	50V
2021	4822 124 21732	10	µF	25V
2022	4822 126 10002	100	nF	25V
2023	4822 126 10002	100	nF	25V
2024	4822 124 11946	22	µF	16V
2025	4822 122 33177	10	nF	50V
2026	4822 122 33177	10	nF	50V
2027	4822 124 40246	4,7	µF	
2028	4822 122 33177	10	nF	50V
2029	4822 126 13836	1	µF	16V
2030	4822 124 22651	1,0	µF	50V
2032	4822 122 33177	10	nF	50V
2033	4822 122 33177	10	nF	50V
2034	4822 126 10002	100	nF	25V
2035	4822 124 11946	22	µF	16V
2036	4822 126 14124	220	pF	
2037	5322 122 32658	22	pF	50V
2038	4822 126 13222	390	pF	63V
2039	4822 124 12052	220	µF	6,3V
2040	4822 126 13695	82	pF	63V
2041	4822 126 10002	100	nF	25V
2042	5322 122 32658	22	pF	50V
2043	5322 122 32966	39	pF	50V
2044	4822 126 10002	100	nF	25V
2045	4822 122 33177	10	nF	50V
2047	4822 124 22726	4,7	µF	35V
2049	4822 126 13691	27	pF	63V
2050	4822 122 33177	10	nF	50V
2052	4822 122 33575	220	pF	50V
2053	4822 124 80231	47	µF	16V
2054	4822 124 40246	4,7	µF	
2055	4822 124 80231	47	µF	16V
2056	4822 124 40246	4,7	µF	
2057	4822 122 33797	47	nF	50V
2060	4822 126 10002	100	nF	25V
2061	4822 126 10002	100	nF	25V
2062	4822 126 13486	15	pF	63V
2063	4822 122 33177	10	nF	50V
2064	4822 122 33575	220	pF	50V
2065	4822 122 33177	10	nF	50V
2066	4822 126 13694	68	pF	63V
2067	5322 122 33538	150	pF	63V
2068	4822 122 33177	10	nF	50V
2069	5322 122 32658	22	pF	50V
2070	5322 122 32531	100	pF	50V
2071	5322 122 34123	1	nF	50V
2072	5322 122 34123	1	nF	50V
2073	5322 122 32659	33	pF	50V
2074	4822 122 33177	10	nF	50V
2075	4822 122 33177	10	nF	50V
2076	4822 122 33177	10	nF	50V
2077	4822 126 10002	100	nF	25V
2078	4822 122 33177	10	nF	50V
2079	5322 122 34123	1	nF	50V
2080	4822 122 33177	10	nF	50V
2081	4822 126 10002	100	nF	25V
2082	5322 122 32269	6,8	pF	50V
2083	4822 126 13692	47	pF	63V
2084	4822 122 33575	220	pF	50V
2085	5322 122 34123	1	nF	50V
2086	4822 126 10002	100	nF	25V
2087	4822 126 13695	82	pF	63V
2088	4822 122 33575	220	pF	50V
2089	4822 126 13691	27	pF	63V
2090	4822 126 13691	27	pF	63V
2091	4822 126 13695	82	pF	63V
2092	4822 126 13695	82	pF	63V
2093	4822 126 13692	47	pF	63V
2094	4822 126 10002	100	nF	25V
2095	4822 126 13836	1	µF	16V
2099	4822 126 10002	100	nF	25V
2101	5322 122 32531	100	pF	50V
2104	5322 122 32658	22	pF	50V
2105	4822 126 13061	220	nF	25V
2106	4822 124 80231	47	µF	16V
2107	4822 122 33177	10	nF	50V
2108	5322 122 32654	22	nF	63V
2110	4822 122 33177	10	nF	50V
2111	4822 122 33177	10	nF	50V
2112	4822 122 33177	10	nF	50V
2113	4822 122 33177	10	nF	50V
2114	4822 122 33177	10	nF	50V
2115	4822 122 33177	10	nF	50V
2116	4822 122 33177	10	nF	50V
2117	4822 122 33177	10	nF	50V
2118	4822 122 33177	10	nF	50V
2122	4822 126 13061	220	nF	25V
2123	4822 122 33177	10	nF	50V
2124	4822 122 33177	10	nF	50V

⚠ ... Safety component, use only this type

Motherboard

2125	4822 124 80231	47 µF 16V	2601	4822 126 10002	100 nF 25V
2126	5322 122 32659	33 pF 50V	2602	4822 124 11946	22 µF 16V
2321	4822 126 10002	100 nF 25V	2603	4822 124 80231	47 µF 16V
2322	4822 126 10002	100 nF 25V	2604	4822 126 13836	1 µF 16V
2323	4822 124 22263	220 µF 25V	2605	4822 122 33177	10 nF 50V
2324	4822 124 22263	220 µF 25V	2606	4822 126 10002	100 nF 25V
2325	5322 121 42661	330 nF 63V	2607	4822 124 80231	47 µF 16V
2326	4822 124 22263	220 µF 25V	2608	4822 126 10002	100 nF 25V
2328	4822 124 22726	4,7 µF 35V	2609	4822 124 80231	47 µF 16V
2400	4822 124 22726	4,7 µF 35V	2610	4822 126 13188	15 nF 63V
2401	4822 126 10002	100 nF 25V	2611	4822 126 14127	39 nF 50V
2402	5322 122 32531	100 pF 50V	2612	4822 122 33175	2,2 nF 50V
2403	5322 122 32531	100 pF 50V	2613	4822 124 21732	10 µF 25V
2404	4822 122 33175	2,2 nF 50V	2614	4822 126 10002	100 nF 25V
2405	4822 122 33575	220 pF 50V	2615	4822 124 80231	47 µF 16V
2406	4822 124 22726	4,7 µF 35V	2616	4822 124 22652	2,2 µF 50V
2407	4822 122 33575	220 pF 50V	2617	4822 126 13836	1 µF 16V
2408	4822 126 13836	1 µF 50V	2618	4822 122 33177	10 nF 50V
2409	4822 122 33575	220 pF 50V	2619	5322 122 34123	1 nF 50V
2411	4822 122 33175	2,2 nF 50V	2620	5322 122 31863	330 pF 50V
2412	4822 122 33177	10 nF 50V	2621	5322 122 34123	1 nF 50V
2451	4822 126 10002	100 nF 25V	2622	4822 122 33806	820 pF 63V
2452	4822 124 11946	22 µF 16V	2623	4822 124 21732	10 µF 25V
2453	4822 126 13836	1 µF 16V	2624	4822 126 13751	47 nF 63V
2454	4822 126 10002	100 nF 25V	2625	4822 121 51574	12 nF 50V
2455	4822 126 10002	100 nF 25V	2626	4822 124 11946	22 µF 16V
2456	4822 126 13691	27 pF 63V	2641	4822 124 80231	47 µF 16V
2457	5322 122 32659	33 pF 50V	2642	5322 122 34123	1 nF 50V
2458	4822 122 33177	10 nF 50V	2643	4822 124 80231	47 µF 16V
2459	4822 126 13691	27 pF 63V	2644	4822 121 43873	27 nF 50V
2461	5322 126 10223	4,7 nF 63V	2645	4822 126 12105	33 nF 63V
2462	4822 124 81029	100 µF 25V	2646	4822 121 41857	10 nF 250V
2463	4822 122 33177	10 nF 50V	2651	4822 124 22726	4,7 µF 35V
2471	4822 124 80231	47 µF 16V	2652	4822 122 33177	10 nF 50V
2472	4822 124 22726	4,7 µF 35V	2653	4822 126 13296	100 nF 16V
2473	5322 126 10223	4,7 nF 63V	2654	5322 122 32654	22 nF 63V
2474	4822 122 33175	2,2 nF 50V	2655	4822 124 22652	2,2 µF 50V
2475	4822 124 80231	47 µF 16V	2656	5322 122 32531	100 pF 50V
2476	4822 126 12105	33 nF 63V	2657	4822 126 13296	100 nF 16V
2477	4822 126 10002	100 nF 25V	2658	4822 122 33891	3,3 nF 63V
2478	4822 122 33177	10 nF 50V	2659	4822 124 80231	47 µF 16V
2479	4822 122 33177	10 nF 50V	2660	4822 124 21732	10 µF 25V
2480	4822 124 22726	4,7 µF 35V	2661	4822 126 13296	100 nF 16V
2482	4822 126 10002	100 nF 25V	2662	4822 122 33177	10 nF 50V
2483	5322 122 32654	22 nF 63V	2663	4822 122 33891	3,3 nF 63V
2484	4822 124 80854	1 µF 50V	2664	4822 124 80231	47 µF 16V
2485	4822 124 80854	1 µF 50V	2665	4822 124 21732	10 µF 25V
2486	4822 124 80854	1 µF 50V	2666	5322 122 34123	1 nF 50V
2487	4822 126 10002	100 nF 25V	2668	4822 126 13061	220 nF 25V
2489	4822 124 22263	220 µF 25V	2669	4822 126 13061	220 nF 25V
2490	4822 126 10002	100 nF 25V	2671	4822 124 22651	1,0 µF 50V
2491	5322 122 32531	100 pF 50V	2672	4822 124 22651	1,0 µF 50V
2492	5322 122 32654	22 nF 63V	2673	4822 124 21732	10 µF 25V
2493	4822 122 33177	10 nF 50V	2674	4822 126 13061	220 nF 25V
2494	4822 126 10002	100 nF 25V	2675	4822 126 13061	220 nF 25V
2495	4822 122 33797	47 nF 50V	2676	4822 124 21732	10 µF 25V
2496	5322 122 32654	22 nF 63V	2677	4822 126 13061	220 nF 25V
2497	4822 122 33177	10 nF 50V	2678	4822 126 13061	220 nF 25V
2501	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2679	4822 124 22651	1,0 µF 50V
2502	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2680	4822 124 21732	10 µF 25V
2503	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2681	4822 124 22651	1,0 µF 50V
2504	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2682	4822 126 13061	220 nF 25V
2505	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2683	4822 124 21732	10 µF 25V
2506	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2684	4822 126 13836	1 µF 16V
2507	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2685	4822 124 21732	10 µF 25V
2508	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2686	4822 126 13061	220 nF 25V
2509	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2687	4822 126 10002	100 nF 25V
2510	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2701	4822 124 81151	22 µF 50V
2511	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2702	4822 126 10002	100 nF 25V
2512	4822 116 10056	VDR 0805 1MA/8V MAX 21V	2703	4822 126 10002	100 nF 25V
2513	4822 124 22726	4,7 µF 35V	2704	4822 126 13836	1 µF 16V
2514	4822 124 80231	47 µF 16V	2705	4822 126 13061	220 nF 25V
2515	4822 126 10002	100 nF 25V	2706	4822 126 14319	8,2 pF 50V
2516	4822 126 10002	100 nF 25V	2707	5322 122 34123	1 nF 50V
2517	4822 126 10002	100 nF 25V	2708	4822 126 13836	1 µF 16V
2518	4822 126 10002	100 nF 25V	2709	4822 122 33177	10 nF 50V
2519	4822 126 10002	100 nF 25V	2710	4822 122 33575	220 pF 50V
2520	4822 126 10002	100 nF 25V	2713	4822 124 11946	22 µF 16V
2521	4822 126 10002	100 nF 25V	2715	5322 122 33861	120 pF 50V
2522	4822 126 10002	100 nF 25V	2716	4822 126 10002	100 nF 25V
2523	4822 124 80231	47 µF 16V	2717	4822 124 22726	4,7 µF 35V

Motherboard

2718	4822 126 10002	100	nF	25V
2719	5322 122 32268	470	pF	50V
2720	4822 126 14498	10	µF	
2721	4822 126 13838	100	nF	
2722	4822 124 11946	22	µF	16V
2723	4822 124 22652	2,2	µF	50V
2725	4822 124 22652	2,2	µF	50V
2726	4822 126 10002	100	nF	25V
2730	4822 126 13836	1	µF	16V
2734	5322 124 41379	2,2	µF	50V
2771	4822 124 21732	10	µF	25V
2772	4822 122 33177	10	nF	50V
2773	4822 126 10002	100	nF	25V
2774	4822 126 10002	100	nF	25V
2775	4822 122 33177	10	nF	50V
2776	4822 124 41584	100	µF	10V
2777	5322 126 10184	680	pF	
2778	5322 122 32531	100	pF	50V
2779	4822 122 33177	10	nF	50V
2780	4822 126 13836	1	µF	16V
2781	4822 126 13836	1	µF	16V
2782	4822 124 40246	4,7	µF	
2783	4822 124 40246	4,7	µF	
2784	4822 126 13836	1	µF	16V
2801	5322 122 32448	10	pF	50V
2802	4822 126 10002	100	nF	25V
2803	4822 126 10002	100	nF	25V
2804	4822 124 80231	47	µF	16V
2805	4822 126 13836	1	µF	16V
2806	5322 122 32448	10	pF	50V
2807	5322 126 10184	680	pF	
2808	4822 126 13836	1	µF	16V
2809	4822 126 13836	1	µF	16V
2810	4822 126 13836	1	µF	16V
2811	4822 122 33177	10	nF	50V
2812	4822 124 80231	47	µF	16V
2813	4822 126 10002	100	nF	25V
2814	4822 122 33177	10	nF	50V
2815	4822 122 33177	10	nF	50V
2816	4822 122 33177	10	nF	50V
2817	4822 126 10002	100	nF	25V
2818	4822 122 33177	10	nF	50V
2819	4822 122 33177	10	nF	50V
2820	5322 126 10223	4,7	nF	63V
2821	4822 122 33177	10	nF	50V
2822	4822 124 40246	4,7	µF	
2823	4822 124 80231	47	µF	16V
2824	4822 126 13836	1	µF	16V
2825	4822 122 33177	10	nF	50V
2826	4822 122 33177	10	nF	50V
2827	4822 124 21732	10	µF	25V
2828	5322 126 10511	1	nF	50V
2829	5322 126 10511	1	nF	50V
2830	4822 126 10002	100	nF	25V
2831	4822 124 21732	10	µF	25V
2832	4822 122 33175	2,2	nF	50V
2833	4822 122 33175	2,2	nF	50V
2834	4822 126 10326	180	pF	63V
2835	4822 126 10326	180	pF	63V
2836	4822 126 13836	1	µF	16V
2837	4822 126 13836	1	µF	16V
2839	4822 124 12052	220	µF	6,3V
2841	4822 124 12052	220	µF	6,3V
2845	4822 122 33175	2,2	nF	50V
2846	4822 126 13836	1	µF	16V
2847	5322 122 32531	100	pF	50V
2849	4822 126 10002	100	nF	25V
2850	5322 121 42386	100	nF	63V
2851	4822 124 80231	47	µF	16V
2852	4822 126 10002	100	nF	25V
2853	4822 126 10002	100	nF	25V
2854	4822 126 13482	470	nF	16V
2855	4822 126 13296	100	nF	16V
2856	4822 126 13751	47	nF	63V
2857	5322 122 33861	120	pF	50V
2860	5322 122 34123	1	nF	50V
2863	4822 126 13061	220	nF	25V
2864	5322 122 33244	8,2	pF	50V
2865	5322 122 32658	22	pF	50V
2866	4822 126 10002	100	nF	25V
2867	5322 122 32658	22	pF	50V
2868	5322 126 10184	680	pF	
2869	4822 126 13836	1	µF	16V

RESISTORS

3001	4822 116 52256	2,2	k	0,5W
3002	4822 051 20182	1,8	k	0,1W
3003	4822 051 10102	1	k	0,25W
3004	4822 051 20822	8,2	k	0,1W
3005	4822 051 10102	1	k	0,25W
3006	4822 116 52289	5,6	k	0,5W
3008	4822 116 83884	47	k	0,5W
3009	4822 051 20101	100	R	0,1W
3010	4822 116 83884	47	k	0,5W
3011	4822 050 11002	1	k	0,4W
3012	4822 116 83882	39	k	0,5W
3013	4822 051 20105	1	M	0,1W
3017	4822 117 11449	2,2	k	0,1W
3019	4822 117 10361	680	R	0,1W
3020	4822 117 11721	1,3	k	0.1W
3021	4822 051 20224	220	k	0,1W
3022	4822 051 20154	150	k	0,1W
3023	4822 051 20101	100	R	0,1W
3024	4822 117 10833	10	k	0,1W
3025	4822 117 11504	270	R	0.1W
3026	4822 051 20472	4,7	k	0,1W
3027	4822 051 20471	470	R	0,1W
3029	4822 051 20471	470	R	0,1W
3030	4822 116 52228	680	R	0,5W
3031	4822 051 10102	1	k	0,25W
3032	4822 117 11449	2,2	k	0,1W
3034	4822 116 52256	2,2	k	0,5W
3035	4822 116 52175	100	R	0,5W
3037	4822 117 11449	2,2	k	0,1W
3038	4822 116 52256	2,2	k	0,5W
3040	4822 116 52228	680	R	0,5W
3041	4822 116 52228	680	R	0,5W
3042	4822 116 83883	470	R	0,5W
3046	4822 117 11449	2,2	k	0,1W
3047	4822 116 83884	47	k	0,5W
3048	4822 116 52234	100	k	0,5W
3059	4822 116 52256	2,2	k	0,5W
3060	4822 116 52195	47	R	0,5W
3061	4822 116 52228	680	R	0,5W
3062	4822 116 83864	10	k	0,5W
3063	4822 116 52226	560	R	0,5W
3064	4822 116 52226	560	R	0,5W
3065	4822 050 11002	1	k	0,4W
3066	4822 116 52256	2,2	k	0,5W
3067	4822 116 83881	390	R	0,5W
3068	4822 050 11002	1	k	0,4W
3069	4822 116 52231	820	R	0,5W
3070	4822 050 11002	1	k	0,4W
3071	4822 116 52219	330	R	0,5W
3072	4822 116 52269	3,3	k	0,5W
3073	4822 116 52207	1,2	k	0,5W
3074	4822 116 52256	2,2	k	0,5W
3075	4822 116 52283	4,7	k	0,5W
3076	4822 100 12157	10	k	
3077	4822 116 52303	8,2	k	0,5W
3078	4822 050 11002	1	k	0,4W
3079	4822 116 52256	2,2	k	0,5W
3080	4822 116 83864	10	k	0,5W
3081	4822 116 52243	1,5	k	0,5W
3082	4822 116 52251	18	k	0,5W
3083	4822 116 52283	4,7	k	0,5W
3084	4822 116 52256	2,2	k	0,5W
3085	4822 051 10102	1	k	0,25W
3086	4822 116 52271	33	k	0,5W
3087	4822 116 52256	2,2	k	0,5W
3088	4822 050 11002	1	k	0,4W
3089	4822 116 52249	1,8	k	0,5W
3090	4822 116 83864	10	k	0,5W
3091	4822 116 52283	4,7	k	0,5W
3092	4822 116 52283	4,7	k	0,5W
3093	4822 117 10833	10	k	0,1W
3094	4822 117 10833	10	k	0,1W
3095	4822 116 52175	100	R	0,5W
3096	4822 116 52175	100	R	0,5W

Motherboard

3097	4822 116 52175	100	R	0,5W
3101	4822 051 20472	4,7	k	0,1W
3102	4822 051 20561	560	R	0,1W
3103	4822 051 20561	560	R	0,1W
3104	4822 051 20112	1,1	k	0,1W
3105	4822 051 20472	4,7	k	0,1W
3106	4822 051 20153	15	k	0,1W
3107	4822 051 20331	330	R	0,1W
3108	4822 051 20472	4,7	k	0,1W
3109	4822 051 20471	470	R	0,1W
3110	4822 051 20331	330	R	0,1W
3111	4822 051 20224	220	k	0,1W
3112	4822 117 10833	10	k	0,1W
3113	4822 051 20331	330	R	0,1W
3114	4822 117 12605	27	k	0,1W
3115	4822 051 20568	5,6	R	0,1W
3116	4822 117 11383	12	k	0,1W
3118	4822 100 12157	10	k	
3119	4822 117 11449	2,2	k	0,1W
3120	4822 051 10102	1	k	0,25W
3321	4822 116 83874	220	k	0,5W
3322	4822 116 52195	47	R	0,5W
3323	4822 117 10833	10	k	0,1W
3325	4822 051 20224	220	k	0,1W
3326	4822 116 83872	220	R	0,5W
3327	4822 116 83872	220	R	0,5W
3328	4822 050 11002	1	k	0,4W
3329	4822 116 83872	220	R	0,5W
3330	4822 116 52283	4,7	k	0,5W
3331	4822 116 52234	100	k	0,5W
3332	4822 117 10833	10	k	0,1W
3334	4822 117 10833	10	k	0,1W
3335	4822 051 20472	4,7	k	0,1W
3336	4822 116 83864	10	k	0,5W
3337	4822 051 20104	100	k	0,1W
3340	4822 050 11002	1	k	0,4W
3341	4822 051 20101	100	R	0,1W
3342	4822 116 52175	100	R	0,5W
3344	4822 116 52175	100	R	0,5W
3345	4822 116 83864	10	k	0,5W
3351	4822 116 52283	4,7	k	0,5W
3352	4822 050 11002	1	k	0,4W
3353	4822 050 11002	1	k	0,4W
3354	4822 117 10834	47	k	0,1W
3355	4822 116 83864	10	k	0,5W
3356	4822 050 11002	1	k	0,4W
3357	4822 116 83884	47	k	0,5W
3358	4822 050 11002	1	k	0,4W
3363	4822 116 83881	390	R	0,5W
3364	4822 116 52264	27	k	0,5W
3370	4822 050 11002	1	k	0,4W
3371 ▲	4822 052 10228	2,2	R	0,33W
3372	4822 051 20223	22	k	0,1W
3373	4822 051 20471	470	R	0,1W
3374	4822 117 11503	220	R	0.1W
3375	4822 117 10833	10	k	0,1W
3376	4822 051 20472	4,7	k	0,1W
3377	4822 116 80176	1	R	0,5W
3378	4822 117 10834	47	k	0,1W
3379	4822 051 20392	3,9	k	0,1W
3380	4822 116 83876	270	R	0,5W
3381	4822 116 52289	5,6	k	0,5W
3382	4822 117 10833	10	k	0,1W
3383	4822 116 83864	10	k	0,5W
3384	4822 116 52283	4,7	k	0,5W
3385	4822 051 20223	22	k	0,1W
3386	4822 116 52264	27	k	0,5W
3387	4822 117 11149	82	k	0,1W
3388	4822 051 20472	4,7	k	0,1W
3389	4822 116 52283	4,7	k	0,5W
3390	4822 051 20471	470	R	0,1W
3391	4822 051 20225	2,2	M	0,1W
3392	4822 051 20104	100	k	0,1W
3393	4822 051 20104	100	k	0,1W
3394	4822 117 10834	47	k	0,1W
3395	4822 116 52175	100	R	0,5W
3396	4822 116 52175	100	R	0,5W
3397	4822 051 20101	100	R	0,1W
3398	4822 051 20472	4,7	k	0,1W
3399	4822 116 52283	4,7	k	0,5W
3403	4822 051 20101	100	R	0,1W

3404	4822 051 20273	27	k	0,1W
3405	4822 117 11507	6,8	k	0,1W
3406	4822 051 20008	0	R	0,1W
3407	4822 051 20101	100	R	0,1W
3409	4822 117 11449	2,2	k	0,1W
3410	4822 117 11449	2,2	k	0,1W
3413	4822 116 52175	100	R	0,5W
3414	4822 116 52175	100	R	0,5W
3415	4822 117 11449	2,2	k	0,1W
3416	4822 117 11148	56	k	0,1W
3417	4822 116 52256	2,2	k	0,5W
3419	4822 117 11449	2,2	k	0,1W
3420	4822 116 52175	100	R	0,5W
3422	4822 117 10834	47	k	0,1W
3423	4822 051 20472	4,7	k	0,1W
3424	4822 116 52283	4,7	k	0,5W
3425	4822 051 20333	33	k	0,1W
3426 ▲	4822 052 10109	10	R	0,33W
3427	4822 117 11503	220	R	0.1W
3428	4822 050 11002	1	k	0,4W
3429	4822 117 10833	10	k	0,1W
3430	4822 051 10102	1	k	0,25W
3431 ▲	4822 052 10109	10	R	0,33W
3432	4822 116 83864	10	k	0,5W
3433	4822 116 52283	4,7	k	0,5W
3434	4822 116 83864	10	k	0,5W
3435	4822 051 20472	4,7	k	0,1W
3436	4822 116 52175	100	R	0,5W
3437	4822 116 52175	100	R	0,5W
3438	4822 117 10834	47	k	0,1W
3439	4822 116 52175	100	R	0,5W
3440	4822 117 10833	10	k	0,1W
3441	4822 116 52234	100	k	0,5W
3442	4822 116 83876	270	R	0,5W
3443	4822 116 83876	270	R	0,5W
3444	4822 116 83876	270	R	0,5W
3445	4822 116 83876	270	R	0,5W
3446	4822 117 10833	10	k	0,1W
3447	4822 116 52175	100	R	0,5W
3448	4822 116 52175	100	R	0,5W
3449	4822 117 10833	10	k	0,1W
3450	4822 117 10833	10	k	0,1W
3451	4822 117 10833	10	k	0,1W
3452	4822 051 10102	1	k	0,25W
3453	4822 116 83864	10	k	0,5W
3454	4822 117 11454	820	R	0,1W
3455	4822 117 10833	10	k	0,1W
3456	4822 116 83864	10	k	0,5W
3457	4822 051 20471	470	R	0,1W
3458	4822 051 10102	1	k	0,25W
3459	4822 117 10834	47	k	0,1W
3460	4822 051 20472	4,7	k	0,1W
3461	4822 117 11148	56	k	0,1W
3462	4822 051 20223	22	k	0,1W
3463	4822 051 20223	22	k	0,1W
3464	4822 117 10834	47	k	0,1W
3465	4822 050 11002	1	k	0,4W
3466	4822 116 52234	100	k	0,5W
3467	4822 116 52256	2,2	k	0,5W
3470	4822 116 83864	10	k	0,5W
3471	4822 050 11002	1	k	0,4W
3472	4822 117 11383	12	k	0,1W
3473	4822 116 52238	12	k	0,5W
3474	4822 116 52283	4,7	k	0,5W
3475	4822 051 20333	33	k	0,1W
3476	4822 117 10834	47	k	0,1W
3477	4822 117 10834	47	k	0,1W
3478	4822 117 10833	10	k	0,1W
3479	4822 116 52256	2,2	k	0,5W
3480	4822 050 11002	1	k	0,4W
3481	4822 116 83864	10	k	0,5W
3482	4822 116 83864	10	k	0,5W
3483	4822 116 83864	10	k	0,5W
3488	4822 051 10102	1	k	0,25W
3490	4822 051 20223	22	k	0,1W
3491	4822 116 83864	10	k	0,5W
3492	4822 116 83884	47	k	0,5W
3493	4822 116 52283	4,7	k	0,5W
3495	4822 116 52256	2,2	k	0,5W
3496	4822 117 11503	220	R	0.1W
3497	4822 117 10833	10	k	0,1W

▲... Safety component, use only this type

Motherboard

3498	4822 117 10833	10	k	0,1W
3499	4822 116 52283	4,7	k	0,5W
3503	4822 116 83872	220	R	0,5W
3504	4822 051 20759	75	R	0,1W
3505	4822 051 20759	75	R	0,1W
3506	4822 116 83872	220	R	0,5W
3507	4822 117 11503	220	R	0.1W
3508	4822 116 83872	220	R	0,5W
3509	4822 117 11503	220	R	0.1W
3510	4822 116 83872	220	R	0,5W
3511	4822 051 20759	75	R	0,1W
3512	4822 116 83872	220	R	0,5W
3513	4822 117 11503	220	R	0.1W
3514	4822 117 11503	220	R	0.1W
3515	4822 117 11503	220	R	0.1W
3516	4822 117 11503	220	R	0.1W
3517	4822 116 83872	220	R	0,5W
3518	4822 051 20759	75	R	0,1W
3519	4822 116 52283	4,7	k	0,5W
3520	4822 117 10833	10	k	0,1W
3521	4822 117 11507	6,8	k	0,1W
3522	4822 117 11148	56	k	0,1W
3523	4822 116 83881	390	R	0,5W
3524	4822 116 52231	820	R	0,5W
3525	4822 116 52271	33	k	0,5W
3526	4822 116 83864	10	k	0,5W
3527	4822 116 83864	10	k	0,5W
3528	4822 116 52238	12	k	0,5W
3529	4822 116 52175	100	R	0,5W
3530	4822 116 52175	100	R	0,5W
3531	4822 116 83864	10	k	0,5W
3532	4822 116 83874	220	k	0,5W
3533	4822 051 20224	220	k	0,1W
3534	4822 116 83874	220	k	0,5W
3535	4822 051 20224	220	k	0,1W
3536	4822 116 83874	220	k	0,5W
3537	4822 116 83874	220	k	0,5W
3538	4822 117 11449	2,2	k	0,1W
3601	4822 116 83884	47	k	0,5W
3602	4822 051 20225	2,2	M	0,1W
3603	4822 051 20822	8,2	k	0,1W
3604	4822 116 52175	100	R	0,5W
3605	4822 116 52175	100	R	0,5W
3606	4822 117 10833	10	k	0,1W
3607	4822 117 11383	12	k	0,1W
3608	4822 117 10965	18	k	0,1W
3609	4822 051 20223	22	k	0,1W
3610	4822 051 20332	3,3	k	0,1W
3611	4822 116 52191	33	R	0,5W
3612	4822 117 11507	6,8	k	0,1W
3613	4822 051 20153	15	k	0,1W
3614	4822 116 52283	4,7	k	0,5W
3615	4822 051 20391	390	R	0,1W
3616	4822 051 20681	680	R	0,1W
3617	4822 117 10833	10	k	0,1W
3618	4822 051 20475	4,7	M	0,1W
3619	4822 051 20224	220	k	0,1W
3620	4822 116 52256	2,2	k	0,5W
3621	4822 051 20822	8,2	k	0,1W
3622	4822 116 52257	22	k	0,5W
3623	4822 117 11383	12	k	0,1W
3624	4822 117 10834	47	k	0,1W
3625	4822 117 11449	2,2	k	0,1W
3626	4822 100 12159	100	k	
3627	4822 117 11952	390	k	0,1W
3628	4822 117 10834	47	k	0,1W
3629	4822 117 11449	2,2	k	0,1W
3630	4822 051 20681	680	R	0,1W
3631	4822 116 52195	47	R	0,5W
3632	4822 051 20109	10	R	0,1W
3633	4822 051 20158	1,5	R	0,1W
3640	4822 116 52219	330	R	0,5W
3641	4822 117 10965	18	k	0,1W
3642	4822 116 52219	330	R	0,5W
3643	4822 051 20392	3,9	k	0,1W
3644	4822 051 20224	220	k	0,1W
3645	4822 051 20333	33	k	0,1W
3646	4822 051 20683	68	k	0,1W
3647	4822 051 20109	10	R	0,1W
3648	4822 051 20158	1,5	R	0,1W
3651	4822 116 83864	10	k	0,5W

3652	4822 117 12708	39, 1	k	
3653	4822 116 52175	100	R	0,5W
3654	4822 116 52175	100	R	0,5W
3655	4822 051 20683	68	k	0,1W
3656	4822 051 20562	5,6	k	
3657	4822 051 20683	68	k	0,1W
3658	4822 051 20562	5,6	k	
3659	4822 051 20104	100	k	0,1W
3660	4822 051 20104	100	k	0,1W
3661	4822 051 20104	100	k	0,1W
3662	4822 051 20104	100	k	0,1W
3663	4822 051 20475	4,7	M	0,1W
3664	4822 050 11002	1	k	0,4W
3701	4822 051 20333	33	k	0,1W
3702	4822 100 12157	10	k	
3703	4822 116 52251	18	k	0,5W
3704	4822 116 52251	18	k	0,5W
3705	4822 117 10834	47	k	0,1W
3706	4822 051 20472	4,7	k	0,1W
3707	4822 051 20472	4,7	k	0,1W
3708	4822 051 20391	390	R	0,1W
3709	4822 051 20472	4,7	k	0,1W
3710	4822 051 20104	100	k	0,1W
3711	4822 051 20562	5,6	k	
3711	4822 051 20472	4,7	k	0,1W
3712	4822 051 20101	100	R	0,1W
3714	4822 051 20101	100	R	0,1W
3715	4822 116 52175	100	R	0,5W
3716	4822 116 52256	2,2	k	0,5W
3717	4822 051 20223	22	k	0,1W
3718	4822 116 52249	1,8	k	0,5W
3719	4822 117 11454	820	R	0,1W not for PAL BG
3719	4822 051 10102	1	k	0,25W only for PAL BG
3720	4822 051 10102	1	k	0,25W
3721	4822 051 20562	5,6	k	
3722	4822 100 12158	22	k	
3724	4822 051 20331	330	R	0,1W
3724	4822 117 11504	270	R	0.1W
3725	4822 051 20154	150	k	0,1W
3726	4822 051 20331	330	R	0,1W
3727	4822 050 11002	1	k	0,4W
3728	4822 051 20471	470	R	0,1W
3728	4822 051 20391	390	R	0,1W
3729	4822 051 20391	390	R	0,1W
3730	4822 051 20471	470	R	0,1W only for PAL BG
3730	4822 051 20391	390	R	0,1W only for SECAM
3731	4822 051 20391	390	R	0,1W
3733	4822 051 20101	100	R	0,1W
3771	4822 116 52175	100	R	0,5W
3772	4822 051 20101	100	R	0,1W
3773	4822 051 20333	33	k	0,1W
3774	4822 051 20472	4,7	k	0,1W
3775	4822 051 20562	5,6	k	
3776	4822 051 20562	5,6	k	
3777	4822 116 83872	220	R	0,5W
3778	4822 116 83872	220	R	0,5W
3779	4822 116 83872	220	R	0,5W
3801	4822 117 12955	2,7	k	
3802	4822 117 12955	2,7	k	
3803	4822 051 20104	100	k	0,1W
3804	4822 116 83864	10	k	0,5W
3805	4822 116 52234	100	k	0,5W
3806	4822 116 52195	47	R	0,5W
3807	4822 116 52234	100	k	0,5W
3808	4822 116 52263	2,7	k	0,5W
3809	4822 117 11139	1,5	k	0,1W
3810	4822 051 20182	1,8	k	0,1W
3811	4822 116 52234	100	k	0,5W
3812	4822 116 52303	8,2	k	0,5W
3813	4822 116 52257	22	k	0,5W
3814	4822 116 52263	2,7	k	0,5W
3815	4822 051 20331	330	R	0,1W
3816	4822 116 52263	2,7	k	0,5W
3817	4822 100 12155	2,2	k	
3818	4822 116 52231	820	R	0,5W
3819	4822 117 10965	18	k	0,1W
3820	4822 117 10965	18	k	0,1W
3821	4822 116 52257	22	k	0,5W
3822	4822 051 20223	22	k	0,1W
3823	4822 051 20474	470	k	0,1W
3830	4822 051 20472	4,7	k	0,1W

▲ ... Safety component, use only this type

Motherboard

3831	4822 051 20104	100	k	0,1W
3832	4822 051 20223	22	k	0,1W
3833	4822 051 20153	15	k	0,1W
3834	4822 051 20472	4,7	k	0,1W
3835	4822 051 20472	4,7	k	0,1W
3836	4822 051 20472	4,7	k	0,1W
3837	4822 117 11449	2,2	k	0,1W
3838	4822 117 11449	2,2	k	0,1W
3839	4822 051 20106	10	M	0,1W
3840	4822 051 20106	10	M	0,1W
3841	4822 051 20333	33	k	0,1W
3842	4822 051 20333	33	k	0,1W
3843	4822 051 20333	33	k	0,1W
3844	4822 051 20333	33	k	0,1W
3845	4822 051 20333	33	k	0,1W
3846	4822 051 20333	33	k	0,1W
3849	4822 051 20104	100	k	0,1W
3851	4822 051 20683	68	k	0,1W
3852	4822 051 20332	3,3	k	0,1W
3853	4822 051 20332	3,3	k	0,1W
3854	4822 116 52195	47	R	0,5W
3855	4822 116 52195	47	R	0,5W
3856	4822 051 20274	270	k	0,1W
3857	4822 116 52175	100	R	0,5W
3858	4822 116 52175	100	R	0,5W
3859	4822 116 52195	47	R	0,5W
3863	4822 116 52195	47	R	0,5W
3867	4822 051 20101	100	R	0,1W
3868	4822 117 11449	2,2	k	0,1W
3869	4822 116 52231	820	R	0,5W
3870	4822 117 11454	820	R	0,1W
3881	4822 117 11454	820	R	0,1W
3882	4822 116 52231	820	R	0,5W
3883	4822 051 20474	470	k	0,1W
3884	4822 117 10839	130	k	0.1W
3885	4822 116 52285	470	k	0,5W
3886	4822 116 83864	10	k	0,5W

RESISTORS

4100	4822 051 20008	0R00 JUMP. (0805)
4101	4822 051 20008	0R00 JUMP. (0805)
4102	4822 051 20008	0R00 JUMP. (0805)
4103	4822 051 20008	0R00 JUMP. (0805)
4104	4822 051 20008	0R00 JUMP. (0805)
4105	4822 051 20008	0R00 JUMP. (0805)
4106	4822 051 20008	0R00 JUMP. (0805)
4107	4822 051 20008	0R00 JUMP. (0805)
4108	4822 051 20008	0R00 JUMP. (0805)
4110	4822 051 20008	0R00 JUMP. (0805)
4111	4822 051 20008	0R00 JUMP. (0805)
4452	4822 051 20008	0R00 JUMP. (0805)
4454	4822 051 20008	0R00 JUMP. (0805)
4481	4822 051 20008	0R00 JUMP. (0805)
4482	4822 051 20008	0R00 JUMP. (0805)
4485	4822 051 20008	0R00 JUMP. (0805)
4486	4822 051 20008	0R00 JUMP. (0805)
4487	4822 051 20008	0R00 JUMP. (0805)
4488	4822 051 20008	0R00 JUMP. (0805)
4489	4822 051 20008	0R00 JUMP. (0805)
4490	4822 051 20008	0R00 JUMP. (0805)
4491	4822 051 20008	0R00 JUMP. (0805)
4492	4822 051 20008	0R00 JUMP. (0805)
4493	4822 051 20008	0R00 JUMP. (0805)
4494	4822 051 20008	0R00 JUMP. (0805)
4496	4822 051 20008	0R00 JUMP. (0805)
4498	4822 051 20008	0R00 JUMP. (0805)
4501	4822 051 20008	0R00 JUMP. (0805)
4651	4822 051 20008	0R00 JUMP. (0805)
4652	4822 051 20008	0R00 JUMP. (0805)
4701	4822 051 20008	0R00 JUMP. (0805)
4702	4822 051 20008	0R00 JUMP. (0805)
4703	4822 051 20008	0R00 JUMP. (0805)
4704	4822 051 20008	0R00 JUMP. (0805)
4705	4822 051 20008	0R00 JUMP. (0805)
4711	4822 051 20008	0R00 JUMP. (0805)
4712	4822 051 20008	0R00 JUMP. (0805)
4722	4822 051 20008	0R00 JUMP. (0805)
4723	4822 051 20008	0R00 JUMP. (0805)
4724	4822 051 20008	0R00 JUMP. (0805)
4771	4822 051 20008	0R00 JUMP. (0805)
4772	4822 051 20008	0R00 JUMP. (0805)
4911	4822 051 20008	0R00 JUMP. (0805)
4912	4822 051 20008	0R00 JUMP. (0805)
4914	4822 051 20008	0R00 JUMP. (0805)
4915	4822 051 20008	0R00 JUMP. (0805)
4916	4822 051 20101	100R00 5% 0,1W

COILS

5001	4822 157 51462	10UH
5002	4822 157 11145	150UH 5%
5003	4822 157 51462	10UH
5004	4822 157 11149	56UH 5%
5005	4822 157 11142	47UH 5%
5006	4822 157 10972	15UH 5%
5008	4822 157 11706	10UH 5% 2,4X3,4
5009	4822 157 11228	LAN02TB101J
5010	4822 157 11139	6,8UH 5%
5061	4822 157 63661	FIL LC VAR 4M286 5VS
5062	4822 157 11149	56UH 5%
5063	4822 157 11145	150UH 5%
5064	4822 157 63661	FIL LC VAR 4M286 5VS
5065	4822 157 11145	150UH 5%
5066	4822 157 10972	15UH 5%
5067	4822 157 11738	330UH 5% 5X3
5068	4822 157 11145	150UH 5%
5069	4822 157 11228	LAN02TB101J
5070	4822 157 63659	FIL LC VAR 1G072 5V2
5071	4822 157 10972	15UH 5%
5072	4822 157 10972	15UH 5%
5073	4822 157 10972	15UH 5%
5100	4822 157 11733	22UH 5% 5X3
5101	4822 157 50961	22 µH
5322	4822 157 50961	22 µH
5323	4822 157 53941	COIL 100MUH PM10
5451	4822 157 11706	10UH 5% 2,4X3,4
5452	4822 157 11706	10UH 5% 2,4X3,4
5453	4822 157 11706	10UH 5% 2,4X3,4
5454	4822 157 60147	2,2UH
5455	4822 157 71206	BLM21A601SPT
5456	4822 157 71206	BLM21A601SPT
5457	4822 157 71206	BLM21A601SPT
5471	4822 157 11734	0,33UH 10% 2,4X3,4
5501	4822 157 11139	6,8UH 5%
5601	4822 157 70038	10000UH 5% 6,8X11
5602	4822 157 53531	COIL ASSY
5641	4822 157 53531	COIL ASSY
5701	4822 157 71206	BLM21A601SPT
5702	4822 157 70877	H292ONS-6785NK
5703	4822 157 11231	LAN02TB1R0J
5704	4822 157 70877	H292ONS-6785NK
5705	4822 157 11733	22UH 5% 5X3
5706	4822 157 11706	10UH 5% 2,4X3,4
5708	4822 157 10972	15UH 5%
5771	4822 157 70038	10000UH 5% 6,8X11
5772	4822 157 71206	BLM21A601SPT
5801	4822 157 11706	10UH 5% 2,4X3,4
5802	4822 157 11706	10UH 5% 2,4X3,4
5803	4822 157 71206	BLM21A601SPT
5804	4822 157 71206	BLM21A601SPT
5805	4822 157 71206	BLM21A601SPT
5806	4822 157 71206	BLM21A601SPT
5807	4822 157 71206	BLM21A601SPT
5851	4822 157 11706	10UH 5% 2,4X3,4
5852	4822 157 11706	10UH 5% 2,4X3,4
5853	4822 157 11706	10UH 5% 2,4X3,4
5854	4822 157 10972	15UH 5%
5856	4822 157 11139	6,8UH 5%

DIODES

6061	4822 130 32778	1SS133
6401	4822 130 31983	BAT85
6460	4822 130 10231	SET:2X SENS + 1X LED
6460	4822 130 10231	SET:2X SENS + 1X LED
6502	4822 130 34197	BZX79-B12
6503	4822 130 80318	MTZ6.8C
6504	4822 130 34197	BZX79-B12
6505	4822 130 34197	BZX79-B12

Motherboard

6506	4822 130 34197	BZX79-B12
6507	4822 130 34197	BZX79-B12
6508	4822 130 34197	BZX79-B12
6601	4822 130 30861	BZX79-B7V5
6701	4822 130 10414	BA792
6702	4822 130 10414	BA792

TRANSISTORS & IC's

7001	4822 130 60511	BC847B
7002	4822 130 60511	BC847B
7003	4822 209 15526	LC89980M
7004	5322 130 60508	BC857B
7005	4822 209 16883	LA71527M
7006	4822 130 60511	BC847B
7007	4822 130 10872	MMUN2112L
7008	4822 130 60511	BC847B
7009	4822 130 60511	BC847B
7010	5322 130 42718	BFS20
7011	5322 130 42718	BFS20
7014	4822 130 60511	BC847B
7015	5322 130 60508	BC857B
7016	4822 130 60511	BC847B
7061	4822 130 60511	BC847B
7062	4822 209 73852	PMBT2369
7063	4822 130 60511	BC847B
7064	4822 130 63732	MMUN2212
7065	5322 130 60508	BC857B
7066	4822 209 90189	TDA4722/V2
7067	4822 130 60511	BC847B
7068	5322 130 60508	BC857B
7091	5322 209 11306	HEF4094BT
7092	4822 130 63732	MMUN2212
7101	4822 130 60511	BC847B
7102	4822 130 60511	BC847B
7103	4822 209 15548	STV5744AD
7104	4822 209 90421	STV5712
7105	4822 130 10872	MMUN2112L
7106	4822 130 10872	MMUN2112L
7107	4822 130 63732	MMUN2212
7322	4822 130 10802	BSH101
7323	4822 130 10214	STD17N06
7324	4822 130 60511	BC847B
7325	4822 130 41344	BC337-40
7326	4822 130 41327	BC327-40
7327	5322 130 60508	BC857B
7328	4822 130 60511	BC847B
7329	4822 130 60511	BC847B
7330	4822 130 10802	BSH101
7401	4822 209 16954	ST24E16M6-22RC548/00
7404	4822 130 60511	BC847B
7406	4822 209 16884	Deck/Control µP
7407	4822 130 41344	BC337-40
7408	5322 130 60508	BC857B
7412	4822 130 10872	MMUN2112L
7413	4822 130 60511	BC847B
7414	4822 130 60511	BC847B
7415	4822 130 60511	BC847B
7440	4822 209 30146	L2722
7441	4822 130 10872	MMUN2112L
7442	4822 130 60511	BC847B
7443	4822 209 30836	SAA1310/N2
7446	4822 209 13126	TDA5241
7451	4822 209 16854	EPROM ACOP5
7452	4822 209 16946	CY62256LL-70PC
7461	4822 130 10231	SET:2X SENS + 1X LED
7462	4822 130 10231	SET:2X SENS + 1X LED
7464	4822 130 10233	TCRT5000L
7465	4822 130 10233	TCRT5000L
7466	4822 130 10234	TCST1030L
7502	4822 130 42615	BC817-40
7504	4822 130 60511	BC847B
7505	4822 130 63732	MMUN2212
7506	4822 209 16886	STV6401
7508	4822 130 63732	MMUN2212
7603	4822 130 60373	BC856B
7604	4822 130 41327	BC327-40
7605	5322 130 60159	BC846B
7606	5322 130 60159	BC846B
7607	4822 130 60511	BC847B
7608	4822 130 42615	BC817-40
7641	5322 130 60508	BC857B
7642	4822 130 60511	BC847B
7643	4822 130 42615	BC817-40
7651	4822 209 16887	TDA9616H/N1
7701	4822 130 63732	MMUN2212
7703	4822 130 60511	BC847B
7704	4822 130 60511	BC847B
7705	4822 209 90452	TDA9814T/V3 for SECAM L
7705	4822 209 90431	TDA9813T/V2 not for SECAM L
7706	5322 130 60508	BC857B
7707	5322 130 42755	BC847C
7708	4822 209 60792	74HC4053D
7709	4822 130 60511	BC847B
7771	4822 209 32501	TDA9840T/V2
7801	5322 130 42718	BFS20
7802	5322 130 60508	BC857B
7803	4822 209 60177	LM339D
7804	5322 130 42718	BFS20
7805	4822 130 10872	MMUN2112L
7806	4822 130 10872	MMUN2112L
7807	4822 209 16888	TA1225N
7830	4822 209 80631	LM339N-00
7831	4822 130 60511	BC847B
7832	4822 130 60511	BC847B
7851	4822 209 16889	SDA5652P
7854	5322 130 60508	BC857B
7855	4822 130 60511	BC847B
7856	5322 130 60508	BC857B
7857	4822 209 63604	BA7046F

Nicam Decoder QNIC, Display Control ADCP3, AKP31

Nicam Decoder QNIC

MISCELLANEOUS

1700▲	4822 071 52501	Fuse	250mA
1710	4822 242 10433	Crystal	8,192 MHz
1970	4822 265 10943	CONN	11P

CAPACITORS

2700	4822 122 33172	390pF	5%	50V
2701	5322 122 32448	10pF	5%	50V
2703	4822 126 10002	100nF	20%	25V
2704	4822 122 33575	220pF	5%	50V
2705	4822 124 22826	10µF		16V
2706	4822 124 22826	10µF		16V
2707	4822 126 13061	220nF	20%	25V
2708	5322 122 32654	22nF	10%	63V
2709	5322 122 32531	100pF	5%	50V
2710	5322 122 32531	100pF	5%	50V
2714	4822 124 23027	47µF		6.3V
2716	4822 124 23027	47µF		6.3V
2718	4822 126 10002	100nF	20%	25V
2719	4822 122 33175	2,2nF	20%	50V
2720	4822 122 33175	2,2nF	20%	50V
2721	4822 126 13061	220nF	20%	25V
2722	4822 122 33175	2,2nF	20%	50V
2723	4822 122 33175	2,2nF	20%	50V
2725	4822 124 23053	1µF	20%	63V
2726	4822 122 33797	47nF	20%	50V
2727	4822 124 23027	47µF		6.3V
2728	4822 126 10002	100nF	20%	25V
2729	4822 124 22826	10µF		16V
2731	4822 124 22826	10µF		16V
2732	4822 126 10002	100nF	20%	25V
2733	4822 124 23027	47µF		6.3V
2734	5322 122 32654	22nF	10%	63V
2736	4822 126 10002	100nF	20%	25V
2752	4822 126 13061	220nF	20%	25V
2753	4822 126 13061	220nF	20%	25V

RESISTORS

3700	4822 051 10102	1K00	2%	0,25W
3701	4822 051 20101	100R00	5%	0,1W
3702	4822 051 20223	22K00	5%	0,1W
3703	4822 051 20104	100K00	5%	0,1W
3704	4822 117 11449	2K2	1%	0,1W
3705	4822 051 20392	3K90	5%	0,1W
3707	4822 116 52276	3K9	5%	0,5W
3708	4822 117 11449	2K2	1%	0,1W
3710	4822 051 20334	330K00	5%	0,1W
3711	4822 116 52175	100E	5%	0,5W
3712	4822 116 52175	100E	5%	0,5W
3713	4822 051 20182	1K80	5%	0,1W
3714	4822 051 20333	33K00	5%	0,1W
3715	4822 117 10833	10K	1%	0,1W
3720	4822 117 10833	10K	1%	0,1W
3721	4822 117 10833	10K	1%	0,1W
3722	4822 117 10833	10K	1%	0,1W
3723	4822 117 10833	10K	1%	0,1W
3790	4822 051 20008	0R00	JUMP (0805)	
3792	4822 051 20008	0R00	JUMP (0805)	
3793	4822 051 20008	0R00	JUMP (0805)	
3794	4822 051 20008	0R00	JUMP (0805)	
3795	4822 051 20008	0R00	JUMP (0805)	
3796	4822 051 20008	0R00	JUMP (0805)	
3797	4822 051 20008	0R00	JUMP (0805)	

COILS

5700	4822 157 63717	6,8MµH
5703	4822 157 71206	BLM21A10
5704	4822 157 71206	BLM21A10
5705	4822 157 71206	BLM21A10
5706	4822 157 71206	BLM21A10
5707	4822 157 71206	BLM21A10

DIODES

6700	4822 130 10652	BB149
6701	4822 130 83757	BAS216

TRANSISTORS & IC's

7700	4822 209 14809	SAA7284Z
7701	5322 209 61487	LM358N

Display Control ADCP3, AKP31

MISCELLANEOUS

1234	4822 273 10341	EVQWMH001
1261	4822 242 82114	EFOEC8004/T4
1262	4822 242 70938	Crystal 32,768 kHz
1272	4822 276 13951	SWITACT 1P 20MA 15V
1273	4822 276 13951	SWITACT 1P 20MA 15V
1274	4822 276 13951	SWITACT 1P 20MA 15V
1275	4822 276 13951	SWITACT 1P 20MA 15V
1280	4822 276 13951	SWITACT 1P 20MA 15V
1281	4822 276 13951	SWITACT 1P 20MA 15V
1282	4822 276 13951	SWITACT 1P 20MA 15V
1284	4822 276 13951	SWITACT 1P 20MA 15V
1286	4822 276 13951	SWITACT 1P 20MA 15V
1920	4822 267 51255	14 P
1921	4822 267 10957	CONN. 3P
1922	4822 267 41098	4 P
1925	4822 267 10955	CONN 3P

CAPACITORS

2200	4822 124 80238	220	µF	5,5V
2201	4822 126 14499	220	µF	
2202	4822 126 10002	100	nF	25V
2203	4822 122 33177	10	nF	50V
2221	5322 122 34123	1	nF	50V
2225	4822 124 11946	22	µF	16V
2230	4822 122 33177	10	nF	50V
2231	4822 122 33797	47	nF	50V
2250	4822 126 13838	100	nF	
2262	4822 126 13486	15	pF	63V
2263	4822 126 13486	15	pF	63V

RESISTORS

3210	4822 116 52175	100	R	0,5W
3211	4822 116 52175	100	R	0,5W
3212	4822 051 20472	4,7	k	0,1W
3215	4822 051 20471	470	R	0,1W
3216	4822 051 20273	27	k	0,1W
3217	4822 051 20273	27	k	0,1W
3218	4822 051 20273	27	k	0,1W
3219	4822 051 20273	27	k	0,1W
3220	4822 117 11503	220	R	0.1W
3221	4822 116 83864	10	k	0,5W
3235	4822 117 10833	10	k	0,1W
3240	4822 117 10833	10	k	0,1W

▲... Safety component, use only this type

Display Control ADCP3, AKP31; Connector PCB ACP3

3241	4822 117 10833	10	k	0,1W
3246	4822 051 20104	100	k	0,1W
3247	4822 051 20104	100	k	0,1W
3250	4822 116 52251	18	k	0,5W
3251	4822 116 52175	100	R	0,5W
3252	4822 116 52175	100	R	0,5W
3257	4822 050 24708	4,7	R	0,6W
3258	4822 050 24708	4,7	R	0,6W
3259	4822 050 24708	4,7	R	0,6W
3269	4822 117 10833	10	k	0,1W
3272	4822 051 20472	4,7	k	0,1W
3273	4822 117 10833	10	k	0,1W
3274	4822 117 10965	18	k	0,1W
3275	4822 051 20393	39	k	0,1W
3279	4822 117 10833	10	k	0,1W
3280	4822 051 20008	0	R	0,1W
3281	4822 051 20182	1,8	k	0,1W
3282	4822 051 20472	4,7	k	0,1W
3284	4822 117 10965	18	k	0,1W
3286	4822 117 10965	18	k	0,1W
3289	4822 117 10833	10	k	0,1W
3299	4822 117 10833	10	k	0,1W
3920	4822 051 20008	0	R	0,1W
3921	4822 051 20008	0	R	0,1W
3922	4822 051 20008	0	R	0,1W
3923	4822 051 20008	0	R	0,1W
3924	4822 051 20008	0	R	0,1W
3925	4822 051 20008	0	R	0,1W
3926	4822 051 20008	0	R	0,1W
3927	4822 051 20008	0	R	0,1W
3928	4822 051 20008	0	R	0,1W
3929	4822 051 20008	0	R	0,1W
3930	4822 051 20008	0	R	0,1W
3931	4822 051 20008	0	R	0,1W
3932	4822 117 10833	10	k	0,1W
3933	4822 051 20008	0	R	0,1W
3934	4822 051 20008	0	R	0,1W
3935	4822 051 20008	0	R	0,1W
3998	4822 051 20008	0	R	0,1W
3999	4822 051 20008	0	R	0,1W

COILS

5200	4822 157 50961	22 µH
5201	4822 158 10604	6,8 MUH

DIODES

6200	4822 130 31983	BAT85
6250	4822 130 61219	BZX79-B10

TRANSISTORS & IC's

7200	4822 209 16895	TMP87CH70F-ADPU1
7202	4822 135 00249	VACUUM FLUORESC. DISPLAY
7220	4822 218 11745	TSOP1736
7231	4822 130 63732	MMUN2212
7232	4822 130 63732	MMUN2212
7240	5322 130 60508	BC857B
7241	5322 130 60508	BC857B

FLAT CABLES

8015	4822 320 12457	FFC 4POL 1925-1921

Connector PCB ACP3

MISCELLANEOUS

1550	4822 276 13951	SWITACT 1P 20MA 15V
1551	4822 276 13951	SWITACT 1P 20MA 15V
1929	4822 267 41098	4 P
1980	4822 267 10955	CONN 3P
1981	4822 323 10448	CABLTREEA 1POL BUPI-1957
1982	4822 267 10956	CONN. 7P
1983	4822 265 11426	CINCH SOCKET 3P YELLOW
1984	4822 265 11427	CINCH SOCKET 3P RED
1985	4822 265 11428	CINCH SOCKET 3P WHITE
1986	4822 265 11429	HSJ1406-01-020
1987	4822 267 10958	CONN. 5P
1988	4822 265 11431	HSJ1406-01-040
1989	4822 267 31773	HSJ1452-01-110

CAPACITORS

2551	5322 122 32268	470	pF	50V
2552	4822 126 13836	470	A	50V
2553	4822 126 13296	100	nF	16V
2554	5322 122 32268	470	pF	50V
2555	4822 126 13836	470	A	50V
2556	4822 126 13296	100	nF	16V
2557	4822 124 22263	220	µF	25V
2558	4822 126 13296	100	nF	16V
2559	4822 126 13836	100	A	16V
2560	4822 126 13836	100	A	16V
2561	4822 124 21732	10	µF	25V
2565	5322 122 34123	1	nF	50V
2566	4822 126 13296	100	nF	16V
2567	4822 124 21732	10	µF	25V
2568	5322 122 32531	100	pF	50V
2569	4822 124 41643	100	µF	
2570	4822 126 13836	100	A	
2571	5322 122 32448	10	pF	50V
2572	4822 124 22263	220	µF	25V
2573	4822 124 22263	220	µF	25V
2580	4822 122 33177	10	nF	50V
2581	4822 122 33177	10	nF	50V
2582	5322 122 34123	1	nF	50V
2583	5322 122 32268	470	pF	50V

RESISTORS

3551	4822 116 10056	VD	R	
3552	4822 051 20105	1	M	0,1W
3553	4822 051 20684	680	k	0,1W
3554	4822 051 20474	470	k	0,1W
3555	4822 051 20472	4,7	k	0,1W
3556	4822 116 10056	VD	R	
3557	4822 051 20105	1	M	0,1W
3558	4822 051 20684	680	k	0,1W
3559	4822 051 20474	470	k	0,1W
3560	4822 051 20472	4,7	k	0,1W
3561	4822 051 20759	75	R	0,1W
3562	4822 116 83868	150	R	0,5W
3563	4822 117 10834	47	k	0,1W
3564	4822 117 10833	10	k	0,1W
3565	4822 117 10833	10	k	0,1W
3566	4822 116 52271	33	k	0,5W
3567	4822 117 10833	10	k	0,1W
3568	4822 051 20333	33	k	0,1W
3569	4822 117 10833	10	k	0,1W
3570	4822 051 20109	10	R	0,1W
3571	4822 051 20109	10	R	0,1W
3572	4822 051 20109	10	R	0,1W
3573	4822 051 20109	10	R	0,1W
3574	4822 051 20109	10	R	0,1W
3575	4822 051 20109	10	R	0,1W
3576	4822 117 10833	10	k	0,1W
3577	4822 117 10833	10	k	0,1W
3578	4822 051 20824	820	k	0,1W
3579	4822 117 11454	820	R	0,1W

Connector PCB ACP3, CABLES & SUB MODULS

3580	4822 051 20104	100	k	0,1W
3581	4822 117 10833	10	k	0,1W
3582	4822 051 20229	22	R	0,1W
3583	4822 051 20153	15	k	0,1W
3584	4822 051 20153	15	k	0,1W
3585	4822 051 20474	470	k	0,1W
3586	4822 117 11149	82	k	0,1W
3587	4822 051 20472	4,7	k	0,1W
3588	4822 117 11503	220	R	0.1W

RESISTORS

4500	4822 051 20008	0R00 JUMP. (0805)
4501	4822 051 20008	0R00 JUMP. (0805)
4502	4822 051 20008	0R00 JUMP. (0805)
4503	4822 051 20008	0R00 JUMP. (0805)
4504	4822 051 20008	0R00 JUMP. (0805)
4505	4822 051 20008	0R00 JUMP. (0805)
4506	4822 051 20008	0R00 JUMP. (0805)
4507	4822 051 20008	0R00 JUMP. (0805)

COILS

5551	4822 157 11145	150UH 5%
5552	4822 157 11228	LAN02TB101J
5553	4822 157 11145	150UH 5%
5555	4822 157 11139	6,8UH 5%
5556	4822 157 11145	150UH 5%
5557	4822 157 11739	220UH 5% 2,4X3,4

DIODES

6551	4822 130 34197	BZX79-B12
6552	4822 130 34197	BZX79-B12
6553	4822 130 34278	BZX79-B6V8
6554	4822 130 34278	BZX79-B6V8
6555	4822 130 83757	BAS216
6556	4822 130 83757	BAS216
6557	4822 130 34278	BZX79-B6V8
6558	4822 130 34278	BZX79-B6V8
6559	4822 130 34197	BZX79-B12
6560	4822 130 34197	BZX79-B12

TRANSISTORS & IC's

7520	4822 209 16193	TDA7053AT
7551	5322 130 42755	BC847C
7552	5322 130 42755	BC847C
7553	4822 130 41096	BC550C
7554	4822 130 41096	BC550C

CABLES

	4822 320 50377	ANTENNA cable
	4822 321 63002	SCART cable
⚠	4822 321 10249	SBC1201 MAINS CABLE
⚠	4822 321 10886	MAINS CABLE UK
	4822 320 50377	CONNECT. CABLE PAL
	4822 321 63002	SCART CABLE(PROJ.50)
	4822 321 62401	AUDIO-CABLE
8001	4822 320 11889	FFC TD1-1961
8003	4822 320 12453	FFC 3POL TD3-1947
8004	4822 320 12454	FFC 6POL TD4-1948
8011	4822 320 12455	FFC 7POL 1982-1956
8012	4822 320 12453	FFC 3POL TD3-1947
8013	4822 320 12461	FFC 1961-1102
8014	4822 320 12456	FFC 3POL 1929-1922
8015	4822 320 12457	FFC 4POL 1925-1921
8018	4822 320 12458	FFC 17POL 1915-1942
8020	4822 320 12459	FFC 14POL 1944-1920

SUB MODULES

1972	4822 214 12236	QNIC

REPAIR KITS

4822 310 11237	POWER SUPPLY REPAIR KIT

⚠... Safety component, use only this type